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Marine Fisheries Abstracts

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Marine Fisheries Abstracts

UNITED STATES DEPARTMENT OF COMMERCE

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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Marine Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Marine Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.112 A FIBER-OPTIC RETROREFLECTIVE TURBIDOMETER FOR CONTINUOUSLY MONITORING CELL CONCENTRATION DURING FERMENTATION

Hancher, C. W., L. H. Thacker, and E. F. Phares (Oak Ridge National Laboratory, Oak Ridge, TE 37830)
Biotechnology and Bioengineering 16, No. 4, 475-484 (Apr. 1974)

The routine analysis of cell mass in microbial cultures is carried out by photoelectron measurements of either light transmission or light scattering. At higher cell concentrations, forward scattering and cell interaction cause less absorption of transmitted light; this requires adjustments such as diluting the medium, use of a shorter light path, or electrical compensation. In the use of a scattered light system, very high cell concentrations cause a decrease in the amount of scattered light reaching the detector and lower the sensitivity of the system at higher angles of scattering. However, as the angle between the incident light and the detector approaches 180°, cells in high concentrations become close, efficient reflectors. To automatically and continuously assay the high cell concentrations in a fermentor, a fiber-optic retroreflective turbidometer was developed. Since the turbidity is measured from back scattered light, absorbance due to the fermentation medium is less of a problem. This principle makes possible the measurement of much higher cell concentrations than is feasible in a transmitted light system. Cell concentrations of more than 50 g per liter can be measured by direct linear readout over the entire range of the detector. An automatic, high-pressure washing procedure cleans the flow cell and prevents

0.4 ON REGENERATION OF SKIN IN CARP

Ozaki, Hisao, Reiko Akima, and Masayuki Harada (Tokyo University of Fisheries, Minato-ku, Tokyo 108, Japan)
Journal of the Tokyo University of Fisheries 59, No. 2, 69-78 (Mar. 1973) [In Japanese; tables, graphs, and summary in English]

After removal of scales, an area of skin was removed from carp in the form of a square one side of which measured a tenth of body length. The skin was removed from the left side between the lateral line and dorsal fin at the anterior end of the dorsal fin. Groups of five fish were treated in this manner. The wound areas were expressed in percent of initial area.

With healing, the wound area enlarged 110% to 150% of the initial area 2 to 7 days after the skin was removed, and then the area receded to initial size 4 to 10 days later. Complete healing occurred in 15 to 35 days after skin removal. Healing occurred more rapidly in larger fish than smaller fish and at higher water temperatures (24.4° C) than lower (14.3° C). Additionally, healing was promoted by repeated injections of thyroxine (from the thyroid gland) or macrobin (promotes healing) and with feed containing a dilute solution of copper sulfate. Healing was retarded slightly by injection of cortisol or by rearing in a dilute solution of mercuric chloride.

The healing mechanisms of the wound are discussed in terms of mammalian mechanisms: cell division inhibitory factor, chalone (balances cell production),

0.38 (1.34) GENETIC ANALYSIS OF NORTH AMERICAN POPULATIONS OF THE PINK SALMON, ONCORHYNCHUS GORBUSCHA, POSSIBLE EVIDENCE FOR THE NEUTRAL MUTATION-RANDOM DRIFT HYPOTHESIS

Aspinwall, Nevin (Dept. of Biology, St. Louis University, St. Louis, MO 63103)
Evolution 28, No. 2, 295-305 (June 21, 1974)

As a result of the use of electrophoretic techniques, knowledge of the amount of genetic variability has increased. Workers in genetics have attempted to establish if the patterns of variations in protein structure in natural populations are related either to selection or to the neutral mutation-random drift hypothesis proposed by M. Kimura [Evolutionary Rate at the Molecular Level. Nature 217, 624-626 (1968)]. The rate of migration (or gene flow) between populations is important to explanations of equalizing genes between natural populations.

The pink salmon was selected for the study because it has a strict 2-year life cycle in returning to spawn in the streams where it was born. There is a population of salmon that returns in even-numbered years and a population that returns in odd years. The migration (gene flow) between these two groups is zero, and it is assumed that selection pressures are identical for both. Spawning pink salmon adults were collected from even and odd year populations from various locations on the the northwest coast of North America; 100 adults were taken from each population. A muscle sample was taken from each individual and otoliths were removed for age determinations. Starch-gel electrophoresis was performed on the muscle samples and staining procedures were used to detect the presence of various muscle enzymes on the gels. Two of the enzymes discussed in the article

0.4 (0.39) ANTICAY -- A NEW FOOD CONCEPT

Smythe, B. M. (C.S.R. Res. Lab., Roseville, New South Wales, 2069, Australia)
Food Technology in Australia 25, No. 8, 383-386 (1973)
Food Science and Technology Abstracts 6, No. 2, 200, Abstract No. 2T53 (Feb. 1974)

The causes of dental caries are outlined in this article, and the presence of a factor in crude carbohydrates that protects against caries is postulated. A substance called Anticay, a mixture of calcium salts of phosphoric esters of sucrose and inorganic calcium orthophosphate, was developed in Australia. The substance is produced by reacting lime with an aqueous solution of sucrose to give a mixture of calcium sucrates; this product is reacted with phosphorus oxychloride at low temperature to give Anticay.

The solubility and lack of taste and odor of Anticay make it useful as an additive to a wide range of sugar, cereal, and starch-based products. Anticay contributes to the reduction of dental caries by its ability to raise the concentration of calcium and phosphate ions in the solutions in contact with the teeth. A review of animal and clinical studies on Anticay is also presented. SW

0.38 (1.34)

are supernatant malate dehydrogenase (MDH) and alpha-glycerophosphate dehydrogenase (alpha-GPDH. The pattern of protein polymorphism variation elucidated in the enzymes by electrophoresis generally showed uniformity within distantly spaced (geographically) odd year or even year Alaskan populations. Differences in the phenotypic (hereditary characteristics) or allelic (opposite characteristics) frequencies occurred between populations occupying the same stream in odd and even years. The data generated by the study showed a pattern of protein polymorphism that supports the hypothesis of neutral mutation-random drift rather than a balancing natural selection.
[4 figures, 3 tables, 16 references] SW

0.36 RELATED LEVELS OF HEAT RESISTANCE OF ALDOLASE AND CHOLINESTERASE OF MUSCLE HOMOGENATES FROM CLOSELY RELATED SPECIES OF AQUATIC ANIMALS

Kusakina, A. A. (Inst. Tsitol., Leningrad, U.S.S.R.)
Chemical Abstracts 81, No. 1, 1396e (July 8, 1974)

0.5 RAPID DETECTION OF CLOSTRIDIUM BOTULINUM TOXIN BY CAPILLARY TUBE DIFFUSION

Mestrandrea, Leonard W. (Food and Drug Administration, Brooklyn, NY 11232)
Applied Microbiology 27, No. 6, 1017-1022 (June 1974)

An adaptation of the procedure of B. L. Vermilyea, H. W. Walker, and J. C. Ayres [Appl. Microbiol. 16, 21-24 (1968)] for the detection of botulinal toxin in foods and cultures was developed and evaluated. Types A, B, and E toxins produced in culture broth with and without added trypsin and type E toxin produced in inoculated clams were tested with this procedure and with the mouse bioassay procedure. With nontrypsinized toxin, as little as 100 minimum lethal doses (MLD) of the toxin per milliliter were detected with the capillary diffusion system; but with trypsinized toxin, only higher levels of toxin (1×10^6 to 1.5 to 10^7 MLD/ml) were detected by the system. The inability of the capillary diffusion system to detect lower levels of trypsinized toxin was due to the presence of thioglycolate in the medium used to produce the toxin.
[1 figure, 2 tables, 20 references] FTP

0.112

blinding of the optical parts by deposited material. The range, linearity, and reproducibility of the turbidometer have been found by test operations to be adequate for routine monitoring of fermentation. Cell concentrations from 1 g to 60 g per liter have been monitored with good results. Some of the potential applications for the turbidometer would be measurement of the turbidity in waste water effluents, suspensions of ores in extraction processes, and dispersed sols in colored solutions. Drawings and electrical diagrams useful in construction of the turbidometer are included.
[8 figures, 7 references] SW

0.119 SEA WATER AND ITS USE IN SMALL RESEARCH AQUARIA (9.16)

Pettitt, Charles (Manchester Mus., Univ. Manchester, Manchester, England)
Chemical Abstracts 80, No. 26, 148940d (July 1, 1974)

0.4

adrenaline, diurnal cell division cycle, effects of stress, and others. The authors suggest that measurement of the healing rate of the wounds in fish may be useful in the study of the effects on fish of some hormones, or chemical substances in polluted water.
[3 figures, 7 tables, 11 references] SW

0.4 ICHTHYOTOXIC ACTIVITY OF PLANTS OF THE GENUS DERRIS AND COMPOUNDS ISOLATED THEREFROM

Mors, Walter B., M. Celia Do Nascimento, Jose Ribeiro Do Valle, and Jose A. Aragao (Inst. Cienc. Biomed., Univ. Fed. Rio de Janeiro, Rio de Janeiro, Brazil)
Chemical Abstracts 80, No. 25, 141669p (June 24, 1974)

0.5 COMBINED EFFECTS OF WATER ACTIVITY, SOLUTE, AND TEMPERATURE ON THE GROWTH OF VIBRIO PARAHAEMOLYTICUS

Beuchat, L. R. (Dept. of Food Science, University of Georgia Agricultural Experiment Station, Experiment, GA 30212)
Applied Microbiology 27, No. 6, 1075-1080 (June 1974)

The growth responses of V. parahaemolyticus over a wide range of water activity values (a_w) were determined. The organism was grown at 36° C in tryptic soy broth (TSB) (at pH 7.8) containing added levels of NaCl ranging from 0.5% to 7.9% (wt/wt). The most rapid generation time of the organism was 16.4 min in TSB containing 2.93% NaCl (TSBS) (a_w of 0.992±0.005). TSBS was used as the basal medium in experiments with other solutes. TSB having lower or higher levels of NaCl resulted in higher or lower a_w, respectively, and slower generation times of the V. parahaemolyticus.

Growth of V. parahaemolyticus at 36° in TSBS containing added amounts of NaCl, KCl, glucose, sucrose, glycerol, or propylene glycol was measured turbidmetrically. These solutes used to reduce the a_w level to comparable values gave extended lag times of varied magnitude, dissimilar growth rate, and different bacterial cell numbers. At similar values, reduction of a_w with glycerol was less inhibitory to growth of the organism than were reductions with NaCl and KCl. When the addition of sucrose, glucose, and propylene glycol were used to establish similar a_w levels lower than 0.992, the greatest effect on extending the lag times of V. parahaemolyticus were achieved.

0.5 (6.34)(6.35) [INVESTIGATIONS ON MICROORGANISMS IN THICKENING AGENTS. I. CELL COUNTS OF AEROBIC MICROORGANISMS] UNTERSUCHUNGEN ÜBER MIKROORGANISMEN IN VERDICKUNGSMITTELN. I. KEIMZAHLEN AEROBER MIKROORGANISMEN

Souw, P., and H. J. Rehm (Inst. fur Mikrobiol., Univ., Münster, Federal Republic of Germany)
Chemie Mikrobiologie Technologie der Lebensmittel 2, 6. 187-193 (1973)
Food Science and Technology Abstracts 6, No. 3, 207, Abstract No. 3T158 (Mar. 1974)

The microorganisms in the vegetable thickening agents, gum tragacanth, gum arabic, karaya gum, carrageenan, alginate, guar flour, and carob bean gum, were investigated. In the thickening agents produced by manual processing (gum tragacanth, gum arabic, and nonprocessed carrageenan) the total bacteria cell counts were much higher (up to 4.7×10^8 cells per gram) than in the pretreated products (alginate, carob bean gum, guar flour, and carrageenan powder). Staphylococcus aureus (coagulase-positive strains) were present up to 0.3×10^6 cells per gram in gum tragacanth and carob bean gum. Escherichia coli was not found in any of the samples. Streptococcus fecalis was found in some samples of gum tragacanth, carrageenan, and guar flour up to 0.5×10^7 cells per gram. The influence of the microbiological state on the quality of the thickening agents was also discussed.
SW

0.7 FACTORS AFFECTING SULFATE-SULFUR UTILIZATION BY THE YOUNG CHICK

Sasse, C. E., and D. H. Baker (Dept. of Animal Science, University of Illinois at Urbana-Champaign, Urbana, IL 61801)
Poultry Science 53, No. 2, 652-662 (Mar. 1974)

Growth assay procedures were used to determine whether dietary sulfate can be used by the chick, and if so, to determine the conditions necessary to produce a consistent response to sulfate supplementation. Six assays were carried out with 8-day-old male chicks; purified crystalline amino-acid diets were used in the first five and practical corn-soybean meal diets in the last. A sulfate-free salt mixture was developed and used in the assays.

Supplementation of the diets with sulfate when sulfur amino acids were deficient (0.40% of the diet) and cystine was first limiting produced a growth response; however, when methionine was first limiting, or when sulfur amino-acid levels were adequate (0.60%), there was no growth response. About equal responses in growth of the chicks were obtained when cystine was more limiting than methionine in the diet, regardless of the ratio between the two amino acids. Potassium sulfate and sodium sulfate were equally efficacious as sources of inorganic sulfate for the chicks. Not more than 0.15% sulfate was needed to elicit a maximal response in chicks fed 0.25% methionine and 0.15% cystine. Apparently, there is no dietary requirement for sulfate per se. Sulfate supplementation of the diet did not produce a growth response in the chicks when they were fed practical corn-soybean meal diets even though the chicks responded to supplemental methionine.

0.7 NICKEL: A NEW ESSENTIAL TRACE ELEMENT

Nielson, F. H., and D. A. Ollerich (U.S. Dept. of Agriculture, ARS, Human Nutritive Laboratory, and Dept. of Anatomy, University of North Dakota, Grand Forks, ND 58201)
Federation Proceedings 33, No. 6, 1767-1772 (June 1974)

Nickel has been suspected of having a physiological role since it was found in animal tissue in 1920. It was initially not found to be essential partly because of the difficulties involved in preparing nickel-free diets for study. Most of the data presented that suggests a physiological role for nickel is indirect. Pharmacological studies indicate that the presence of nickel intensifies and prolongs the hypoglycemic effect of insulin in the rabbit and dog; nickel added to posterior pituitary extract prolongs its antidiuretic effect in rats; and nickel has an adverse effect on the hypertensive action of epinephrine. Nickel also has the effect of altering lipid metabolism, and it can substitute for calcium in the process of nerve transmission and muscle excitation. In vitro reactions of nickel indicate that it participates in enzyme activation, and it has effects on other biochemical structures such as RNA and DNA.

Other reports indicate that feeding a diet containing less than 40 ppb nickel resulted in a nickel deficiency syndrome in chicks and liver changes. In this present report nickel deficient diets containing only 3-14 ppb nickel were fed to chicks; the other ingredients were dried skim milk, ground corn, and corn oil. The variation in the nickel content was due to the amount of nickel in batches of ground corn. The chicks were maintained in a controlled environment to prevent

0.7 EFFECT OF PROTEIN INTAKE ON CALCIUM BALANCE OF YOUNG MEN GIVEN 500 MG CALCIUM DAILY

Anand, Chander Rekha, and Hellen M. Linkswiler (Dept. of Nutritional Sciences, Univ. of Wisconsin, Madison, WI 53706)
Journal of Nutrition 104, No. 6, 695-700 (June 1974)

The effect of level of intake of protein on urinary and fecal calcium and on calcium balance when the calcium intake was 500 mg daily (considered moderate) and the protein intake was varied from 47 to 95 to 142 grams daily was determined. Also, an attempt was made to determine if any detrimental effect on calcium balance of high protein diets could be overcome by increasing the intake of fruits and vegetables. Nine men (ages 19 to 22 years) were used in this 62-day metabolic study.

When the protein intake of the subjects was 47 g daily, the mean calcium retention was 31 mg; two subjects showed a slight negative balance. When the protein intake of the subjects was 95 g and 142 g daily, respectively, the mean calcium balance was -58 mg and -120 mg; none of the subjects was in calcium balance. Increasing the intake of fruits and vegetables by 50% had no beneficial effect on the calcium balance of the subjects. The urinary calcium increased with the increases in protein intake; the mean value was 168, 240, 301, and 278 mg, respectively, when the low (47 g daily), the medium (95 g), the high (142 g) protein and the high protein-high fruit and vegetable diet was given. The level of fecal calcium was not affected by the level of protein intake.
[2 tables, 10 references] FTP

0.7

the addition of nickel through the drinking water or other sources. The chicks were fed the diet for 3.5 weeks. Oxygen uptake and other analyses of the liver showed impaired metabolism and morphology. The data indicated a reduced ability to oxidize α-glycerophosphate, an increase in the lipid fraction, a decrease in the phospholipid fraction, and ultrastructure degeneration in the liver cells. The color of the shank skin changed and the consistency of the liver also changed. Preliminary studies of nickel deficiency in rats gave the same results. The authors suggest that these findings are consistent with the conclusion that nickel is an essential nutrient for chicks and rats.
[3 figures, 5 tables, 52 references] 5W

0.5

The minimal a_w for growth of the organism at 15°, 21°, 29°, and 36°±0.2° C for each of four strains of V. parahaemolyticus was tested in TSBS containing added solutes. Each strain responded similarly to the test conditions. The organism tolerated reduced a_w at 29° C, but at 15° C higher minimal a_w was required. The various solutes added to TSBS to achieve reduction in a_w, minimal a_w for growth after 20 days, and incubation temperatures were glycerol, 0.937, 29° C; KCl, 0.945, 29° C; NaCl, 0.948, 29° C; sucrose, 0.957, 29° and 36° C; glucose, 0.983, 21°C; and propylene glycol, 0.986, 29° C. Apparently, minimal a_w for growth of V. parahaemolyticus depends upon the solute used to control a_w.
[3 figures, 2 tables, 22 references] FTP

0.7

Cystine should have been more limiting than methionine in the diet; the analyses suggest that the level of sulfate in the basal diet was too high to allow a response to supplemental sulfate.
[9 tables, 15 references] FTP

0.5 FACTORS DETERMINING THE POSSIBILITY OF EXISTENCE OF THERMOPHILIC BACTERIA AT HIGH TEMPERATURES

Loginova, L. G. (U.S.S.R.)
Chemical Abstracts 80, No. 25, 142784j (June 24, 1974)

0.5 ISOLATION OF VIBRIO PARAHAEMOLYTICUS IN NEW ZEALAND (2.05)

Cawley, P., and D. Norris (Natl. Inst. Health, Dep. Health, Wellington, New Zealand)
N.Z. Med. J. 78, No. 496, 107 (1973)
Aquatic Sciences & Fisheries Abstracts 4, No. 5, 254, Abstract No. 4Q5257M
(May 1974)

V. parahaemolyticus has been identified in New Zealand coastal waters. This organism is an important cause of food poisoning from marine sources, and it is a causative agent of wound infection. SW

0.7 REQUIREMENT OF WHITE LEGHORN LAYING AND BREEDING HENS FOR METHIONINE AS INFLUENCED BY STAGE OF PRODUCTION CYCLE AND INORGANIC SULFATE

Jensen, L. S., L. Falen, and G. W. Schumaier (Dept. of Animal Science, Washington State University, Pullman, WA 99613)
Poultry Science 53, No. 2, 535-544 (Mar. 1974)

The purpose of these experiments was (1) to obtain further information on the methionine requirement of laying hens during different stages of the laying cycle, (2) to determine if a methionine deficiency will affect hatchability of eggs, and (3) to obtain information on the sparing effect of inorganic sulfate on the methionine requirement of hens. Four tests were carried out with Single Comb White Leghorn pullets housed in cages. Three basal diet were used: corn-soybean meal (14% protein), corn-soybean meal (16% protein), and corn-pea (dry peas) (16% protein). The corn-pea and the corn-soybean (14% protein) rations contained calculated values of methionine and methionine plus cystine below that recommended by the National Research Council.

In two of the feeding tests, it was found that hatchability of fertile eggs was not affected by a methionine deficiency; two other tests showed lower hatchability at the lowest level of methionine, but the differences were not significant. Apparently, a level of methionine adequate for optimum egg production and egg weight is also adequate for maximum hatchability.

When methionine was added to the corn-soybean meal ration (16% protein), no improvement in any of the parameters measured were noted. In one feeding test in

0.7 BIOLOGICAL ASSESSMENT OF AVAILABLE IRON IN FOOD PRODUCTS

Amine, Ezzat K., and D. M. Hegsted (Dept. of Nutrition, Harvard School of Public Health, Boston, MA 02115)
Journal of Agricultural and Food Chemistry 22, No. 3, 470-476 (May-June 1974)

The use and accuracy of the bioassay procedure of E. K. Amine, R. K. Neff, and D. M. Hegsted [J. Agr. Food Chem. 20, 246 (1972)] for various iron preparations and fortified and unfortified food products was studied. Also, comparative data were obtained on the absorption of radioiron added to the diets containing these materials; this concerns the extrinsic labeling of foods as a method for evaluating the availability of iron in foods [J. D. Cook, M. Layrisse, C. Martinez-Torres, R. Walker, E. Monsen, and C. A. Finch, J. Clin. Invest. 51, 805 (1972)]. The products were assayed for "available iron" using rat assays. In the first experiment the "prophylactic" assay was used in which the animals were fed the various experimental diets after receipt of the animals in the laboratory; varying degrees of anemia developed depending upon the dosage and availability of the dietary iron. In the second experiment the "curative assay" was used in which the animals were depleted of iron prior to study. The curative assay method is more satisfactory than the prophylactic assay. The availability of iron in the products varied greatly, and in some products fortified with ferric orthophosphate, the added iron appeared to be essentially unavailable. In certain other food products, ferric orthophosphate seemed to be a satisfactory form of iron. The availability of iron in a food product may depend upon the form of iron added, the nature of the foodstuff fortified, and the manufacturing process.

0.7 (4.9) FAT IN TODAY'S FOOD SUPPLY--LEVEL OF USE AND SOURCES

Rizek, Robert L., Berta Friend, and Louise Page (Consumer and Food Economics Institute, U.S. Dept. of Agriculture, Hyattsville, MD 20782)
Journal of the American Oil Chemists' Society 51, No. 6, 244-250 (June 1974)

The kinds and amounts of fats consumed currently by people are different from those of ancient times when the way of living and the diet were based on the hunting and gathering of food. National food supply statistics of the United States since the beginning of the twentieth century were examined for changes in foods consumed relative to the level and sources of fat in the American diet.

Fats and oils and fat containing foods, such as meat and milk, have increased about 25% in the U.S. diet over the past 60 years on a per person per day basis. Currently, about 40% of the fat comes from fats and oils; over a third comes from meat, poultry, and fish; and about one-eighth comes from dairy products. More vegetable fats in margarine, shortening, salad oil, and cooking oil, and less animal fats are being consumed. There has been, however, an increase in animal fats in the diet associated with greater consumption of meats. Although there has been an overall decline in animal fats in the diet, they provide about one-quarter of the total calories. However, animal products continue to account for the largest proportion of the calories provided by fats.

There have also been changes in the kinds and amounts of fatty acids in the U.S. diet. Of the total unsaturated fatty acids, and the unsaturated oleic and linoleic acids studied, linoleic acid consumption of 23.1 g per person per day

1.0146 (1.8) THE IMPACT OF MECHANICAL HARVESTING ON THE THAMES ESTUARY COCKLE FISHERY

Pickett, Graham
Laboratory Leaflet No. 29, Fishery Laboratory, Ministry of Agriculture, Fisheries, and Food, Lowestoft, Suffolk, England (Nov. 1973), 23 pp.

The bottom of the Thames River estuary and the other two fisheries for cockles in the United Kingdom consists of extensive mudflats and sandbanks; this ground is ideally suited to support large stocks of cockles. Cockles are found between the levels of high-water neap tide and low-water spring tide; they live in the top 1 or 2 inches (2.5-5 cm) of sand or mud and are usually gathered during the low-water period with a hand rake. In most areas the regulations of local sea fisheries committees prohibit mechanical methods of gathering shellfish. The Thames estuary regulations do not prohibit mechanical methods but control the size of any dredge used in the area. The White Fish Authority demonstrated in the Thames estuary a recently developed continuous delivery hydraulic dredge in a commercial-scale trial. While the dredging was at the trial stage, studies were carried out to determine its efficiency and effects on the cockle beds. The results of the study of dredging were compared to hand raking. The advantages of dredging are (1) more efficient than hand raking, and large catches are possible on low densities; (2) fishing is not restricted to one area in one day; (3) the cockles are cleaner when they come on board; (4) sublittoral cockles are available to a dredge; and (5) dredging is time and labor saving. The disadvantages of dredging are (1) a high proportion of the catch is made unsuitable for processing

0.7 (4.9)

is more than double that of the years 1909-1913. Changes in foods consumed have resulted in more saturated fatty acids derived from beef, dairy products, salad oils, and cooking oils, and less derived from butter and lard. The higher levels of linoleic acid consumed are due to increased use of salad and cooking oils. Saturated fatty acids in the diet today comprise about 36% of the total fat; they comprised about 40% of total fat in the years 1909-1913. Saturated fatty acids now comprise 15% of the total calories in the diet. This is an increase of 2% over dietary saturated fatty acids in the years 1909-1913.
[11 figures, 1 table, 3 references] SW

0.8 FOOD ADDITIVES. BOILER WATER ADDITIVES

Chemical Abstracts Service (81), No. 1, 2472h (July 8, 1974)

Food Drug Administration, Washington, D.C.

Anonymous

0.7

which methionine was added to the corn-soybean ration (14% protein), egg production was significantly improved, but not in a second experiment. When methionine was added to the corn-pea ration (16% protein), egg production and egg weight was always improved. A methionine requirement of from 290 to 300 mg/hen/day appears adequate for optimum egg yield. However, with the corn-pea ration (16% protein), the methionine requirement was higher for production of maximum egg weight than for maximum production of eggs.

A significant response in egg production and egg weight was obtained when the diet was supplemented with methionine, even though the diet was also supplemented with 0.2% potassium sulfate. These results seem to indicate that the hens were receiving enough inorganic sulfate from their diet plus their water supply and that the requirement determined under the conditions used was for methionine to serve as an amino acid in egg protein synthesis rather than for methionine to serve as both an amino acid and a source of sulfate.
[6 tables, 14 references] FTP

1.0146 (1.8)

by breakage besides killing those not taken by the dredge; (2) overexploitation without adequate regulation could reduce cockle population to dangerously low levels; (3) damage to the seabed; (4) running, repair, and maintenance costs of the boats require high productivity; and (5) more labor is required on land for adequate processing as a result of breakage. The Thames estuary landings have increased as a direct result of dredging and have reached a fairly stable level partly dictated by the demand of limited markets.
[10 figures, 10 references] SW

0.7

The researchers found, too, that the measurement of "available iron" by estimating the absorption of a small dose of ^{59}Fe added to the foodstuff apparently is not a satisfactory estimate of available iron.
[2 figures, 5 tables, 15 references] FTP

0.8 BEHAVIOURAL ASPECTS OF RESEARCH MANAGEMENT -- A REVIEW
(9.5)

Blume, Stuart S. (Civil Service College, 11 Belgrave Rd., London SW1, England)
Research Policy 3, No. 1, 40-76 (Apr. 1974)

The author summarizes the recent literature on behavioral science dealing with the management of research personnel and the organization of research function. Most of the literature relates to the industrial situation; however, the author attempts to point out its relevance for management in the public sector. The sections of the report include: Introduction; Goals and Performance; Communications of scientists; The productivity of scientists; and Rewards in context.
[61 references] FTP

1.01510 (9.3) FISHERIES OF THE INDIAN OCEAN
ISSUES OF INTERNATIONAL MANAGEMENT AND LAW OF THE SEA

Tussing, Arlon R. (University of Alaska), Robin Ann Hiebert, and Jon G. Sutinen
Paper No. 5, Program of International Studies of Fishery Arrangements. Resources for the Future, Inc., 1775 Massachusetts Ave., NW, Washington, DC. 20036 (June 1974), xiv + 55 pp. $3.00, paperbound.

Of the various categories of fish stocks in the Indian Ocean, only the larger tuna and the crustacean resources are being exploited. The tunas are caught mainly on the high seas by non-Indian Ocean country fishermen, and the shrimp are taken by fleets under local jurisdiction. Controls on fishing effort to prevent waste are necessary in both types of fisheries. The management arrangements to accomplish conservation must be international in the tuna fishery, and national in the shrimp fishery. Growing demand has increased pressure on the underutilized and fully utilized resources of the Indian Ocean.

The present and potential problems in the management of Indian Ocean fisheries are identified in this report. Solutions to the problems are also considered. The first part deals with existing and potential fisheries. Part two covers management of various fish stocks: tunas, demersal fisheries, shrimp, and schooling pelagic fish. The third part contains issues with regard to international management. The issues include oceanic tunas, neighboring states, migratory species other than tuna, non-Indian Ocean countries, and fishmeal factoryships. Part 4 covers management and its objectives, principles, and tools. Part

1.89 (1.0117) THE COMMERCIAL CRAWFISH INDUSTRY OF SOUTH LOUISIANA

Gary, Don L. (Dept. of Earth Sciences, Nicholls State Univ., Thibodaux, La.)
Publication No. LSU-SG-74-01, Center for Wetland Resources, Louisiana State Univ., Baton Rouge, LA 70803 (Jan. 1974), ix + 59 pp. $3.00

This report is an overview of the Louisiana crawfish (Astacidae) industry. It was prepared to serve as background information for persons involved in the management and development of living resources in the Louisiana coastal zone and for persons who wish to evaluate the potential for development of a crawfish industry elsewhere.

The annual production of crawfish from Louisiana is about 11 million pounds: 5 million pounds from managed ponds and 6 million pounds from unmanaged sources. The commercial crawfish production of Louisiana is larger than all the rest of the United States combined. Crawfish farming appears to be a profitable use of poorly drained wasteland. Commercially managed ponds totaled 2,000 acres in 1960, 18,000 acres in 1970, and about 44,000 acres in 1973. The recent rapid increase is due to development and dissemination of information on crawfish management techniques and to favorable support on the part of the state and federal agencies and commercial associations. Most of the ponds are located on back lands of the natural levees of the Mississippi River and of the bayous on opposite sides of the Atchafalaya Basin. Most of the rest of the ponds are on rice fields in the western part of South Louisiana. Rice Cultivation and crawfish culture is possible simultaneously in the leveed rice fields. The advantages of using rice fields for crawfish culture is that the initial investment for levee construction is not required

1.26 THE CAPELIN (MALLOTUS VILLOSUS) BIOLOGY, DISTRIBUTION, EXPLOITATION, UTILIZATION, AND COMPOSITION

Jangaard, P. M. (Fisheries and Marine Service, Dept. of the Environment, Halifax, Nova Scotia, Canada)
Bulletin 186, Fisheries and Marine Service, Dept. of the Environment, Ottawa, Canada (1974), 70 pp. Price, Canada $3.00. Outside Canada, $3.60.

This bulletin was prepared because of the increasing interest in the use of capelin for human consumption. The following topics were considered: life history, common names, general description, distinctive features, meristic characteristics. growth, and feeding; occurrence; fishery procedures, handling, unloading, and use of preservatives; utilization, processing, and equipment; and chemical and nutritional composition of whole capelin, capelin meal, and capelin oil.

The capelin is a cold-water pelagic fish; it occurs in the northern regions of the Atlantic and Pacific Oceans. Mature males are about 17-19 cm and mature females about 15-17 cm long. The spawning stock consists mostly of 3- and 4-year-old fish; spawning takes place on beaches and in deeper water in March and April in northern Norway and Iceland, and in June and July in Newfoundland-Laborador.

Underutilized stocks of capelin exist in the northwest Atlantic where exploitation is beginning. The stocks in the Barents Sea are heavily exploited. The fish are caught by purse seines and midwater trawls in offshore areas and with various types of seines, traps, and dipnets inshore.

Most of the catch of capelin is processed into meal and oil, but increasing quantities are being frozen, canned, dried, or smoked for human consumption.

1.9 PRODUCT DEVELOPMENT OF UNDEREXPLOITED SPECIES

Uebel, Wolfgang
Regional Report No. 9, Newfoundland Inshore Capelin Development Program, Environment Canada, P.O. Box 5667, St. John's, Newfoundland, Canada (1973), 14 pp.

This bulletin is presented to make the fish processing industry aware of the potential product opportunities that were developed for fish species which have been either underutilized or discarded in the past. Three underexploited species were caught and experimental food preparations were produced from them for evaluation.

Atlantic saury or billfish (Scomberesox saurus) occurrence in Canadian waters is erratic; however, they are found from eastern Newfoundland south to Nova Scotia. The size of the fish is rarely over 17 inches. Schools of billfish were found scattered over the surface of Conception Bay, Newfoundland, and appeared to be most plentiful in the early morning. Moisture, protein content, and fat content of fresh billfish were shown to be 64.4%, 19.7%, and 13.7%, respectively. Marinated products obtained from billfish fillets received excellent ratings by taste panelists. The following canned billfish products were accepted by panelists from the government, the trade, and distributors: smoked fillets in oil, fillets in tomato sauce, fillets in mustard sauce, and fried fish in oil. Directions for processing and recipes for sauces and spices are given.

The roughhead grenadier (Macrourus berglax), size up to 36 in. long, is found off Newfoundland south to Georges Bank at depths from 100 to 400 fathoms and is not exploited. Quick frozen fillets (fat content 1%-2%) were processed; the flesh

1.26

The fat content of capelin ranges from 16% to 20% in the fall and from 1% to 3% in the spring and early summer immediately after spawning. Capelin oil has a low iodine value similar to that of herring oil. Capelin meal contains 67% to 70% protein. Considerable data are presented on the proximate composition, mineral content, and amino-acid content of capelin meals and protein concentrates, and the vitamin content of capelin meals. Data are also given on the unsaponifiable constituents of capelin oil, and the fatty acid composition of capelin lipids. [54 figures, 13 tables, 187 references] FTP

1.01510 (9.3)

5 is a consideration of the consequences of extending national fisheries jurisdiction, in relation to underutilized species, migratory fish, and international sharing.

A list of the Indian Ocean Fishery Commission and other international bodies and fishery statistics of the Indian Ocean are included in two appendices. A series of tables gives the statistics of the fisheries in the Indian Ocean, and a map is shown defining the region.
[38 references] SW

1.9

is similar to cod and flakes easily after cooking. Smoked fillet canned in vegetable oil was rated very juicy with an excellent smoked flavor. Frozen smoked fillets were prepared by dry salting and smoking fresh fish. After cooling they are quick frozen. The product, with a reddish-golden color and a dry texture, was rated "good" for its smoked flavor. Preparation of another form of frozen smoked fillets and spiced canned fillets are described. The processes and recipes for the various brines are also given.

The American eel (Anguilla rostrata) is found in Canadian rivers, lakes, and estuaries from Labrador south. The size range is up to 3¼ ft for females and up to 2 ft in length for males. They are also underexploited. The processed eels were trapped in the brackish Flat Bay area of St. Georges Bay. In their different stages of development eels have the following fat contents: yellow-bronze belly, 10.5%; yellow belly 2.0% to 3.5%; silver belly, 15.0% to 17%, and bronze belly, 25.0%-30.2%. The eels are cut open, cleaned, washed and partly skinned. They are then brined and smoked at temperatures to 60° C. This product was rated excellent for human consumption and maintained good quality after freezing. Fillets, smoked at 75° C for 30 min and canned, were rated good. Eels in the yellow-belly stage with low fat content could not be used to produce acceptable products. Canned skinless smoked products were rated too soft in texture and too weak in flavor. Smoked dressed eels had better flavor, taste, and texture. SW

1.953 (9.2) INTERNATIONAL WHALING STATISTICS LXXI AND LXXII

Anonymous

Committee for Whaling Statistics, Oslo, Norway (1973). No. 71, 49 pp; No. 72, 19 pp.

Number 71 comprises results for the 1972 catch of Antarctic pelagic expeditions in the 1971-72 season and for other expeditions and shore stations outside the Antarctic region in the calendar year 1972. The statistics include the numbers of whales killed by species, in the main whaling areas, by country. Oil production in the main areas and sperm oil production are also listed.

Number 72 comprises the results of Antarctic whaling in the season 1972-73. SW

1.89 (1.0117)

and the rice fields are underlaid with a hardpan that makes for efficient flooding. Although the yields of the swamp ponds are less than that for open or rice field ponds, the costly complete clearing is not required as an initial expense of crawfish farming in swamp ponds. Average yield of crawfish per acre is about 500 lb for the rice ponds and about 300 lb for the swamp ponds.
[26 figures, 6 tables, 94 references] FTP

1.87 AMERICAN LOBSTERS AT ARTIFICIAL REEFS IN NEW YORK

Briggs, Philip T., and Chester S. Zawacki (New York State Dept. of Environmental conservation)

New York State Fish and Game Journal 21, No. 1, 73-77 (Jan. 1974)

Two artificial reefs were established south of Long Island to attract game fish. Kismet reef located in Great South Bay under about 6 m of water, is about 457 m long and 46 m wide. Fire Island reef lies in about 21 m of water in the Atlantic Ocean and is about 1.6 km long and 0.2 km wide. Experimental fishing with traps indicated that legal size lobsters were resident in the waters around the reefs, although most of the animals caught were juveniles. The authors conclude that it may be feasible to build artificial reefs to attract lobsters as well as fish for commercial fishermen.
[4 figures, 1 table, 4 references] SW

1.86 (2.3)(2.8) CATCHING, CLEANING, AND COOKING BAY CRABS

Lionberg, Jay B. (Oregon State University)

S.G. No. 30, Oregon State University Extension Service, Marine Advisory Program, Corvallis, Oreg., 7 pp. (May 1974)

2.02 BONDED MEAT PRODUCT

Nisshin Oil Mills Ltd. (pat.)
Japanese Patent 74 01542
Fopd Technology 28, No. 6, 99 (June 1974)

A mixture of spun protein, comminuted animal meat, and a gelling agent is converted to a product having a meatlike texture. [A copy of the Japanese patent, in the original language, may be obtained from L. Janowski, 18 Edgewater Dr., Dover, MA 02030 U.S.A. Price $2.50.] FTP

2.113 PROCEEDINGS OF THE THIRD INTERNATIONAL CONGRESS ON MARINE CORROSION AND FOULING

Acker, Robert F., B. Floyd Brown, John R. De Palma, and Warren P. Iverson (editors)
Northwestern University Press, Northwestern University, Evanston, Ill. (1973), xiv + 103 pp.

The meeting was held at the National Bureau of Standards, Gaithersburg, Md., Oct. 2-6, 1972. There were 78 papers presented at the meeting in addition to the welcome and opening addresses by John D. Hoffman and V. Romanovsky, respectively. The papers were prepared by 140 authors. Four of the papers and the "Summary of the Congress" are in French.

The subjects in the presentations to the Congress include: the effects of corrosion and fouling on ships' hulls and harbor facilities; protection of metallic and reinforced concrete materials by coatings and electrons; the use of alloys in resisting corrosion; erosion of materials caused by cavitation; stress failures in metals caused by corrosion; corrosion and fouling caused by microorganisms; other fouling organisms; timber colonization by marine organisms; chemical and nutritional aspects of corrosion and fouling; marine fouling in various parts of the world; and antifouling systems. A subject index is included. SW

2.113 LONGER LIFE FOR YOUR PROP

Bosman, L. (Lips V.V., Drunen, The Netherlands)
World Fishing 23, No. 4, 50 (Apr. 1974)

Propeller bronze is inherently resistant to corrosion by seawater; however, electrical processes caused by rotation may produce corrosion. During rotation of the propeller, there are differences in water velocity between the blade tips and the hub or other areas of the propeller. Because of these differences, more metal ions from the area of the blade tips go into solution than from the region of the hub. This results in the transport of an electrical charge from the blade tips to the hub and tends to increase corrosion in areas where the water velocity is highest. In addition, high local turbulence tends to break down the normal surface film of the propeller material which allows further corrosion to occur. This type of corrosion can be prevented if the transport of the electrical charge in the propeller material can be neutralized.

To neutralize the transported electrical charge, an opposing current from an external source is necessary. The steel hull is a natural source for such a current. The hull can supply the current if it is connected to the propeller shaft through a low resistance pathway. The shaft rotates in an oil film as it passes through the hull and a continuous electrical contact between the two cannot be maintained. Therefore an arrangement (shown in the figure) of slip rings on the shaft in contact with brushes connected by cables to the hull will provide the necessary decrease in potential between the shaft and hull to reduce the corrosion of the propeller. A continuously connected millivoltmeter monitors the potential; a potential difference above 60 mV indicates that contact between the

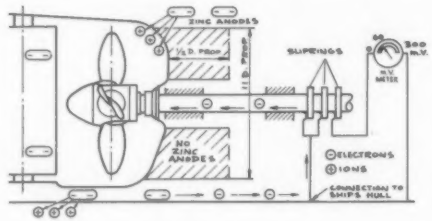
2.117 THE IMPACT-RESISTANCE OF MODIFIED FERRO-CEMENT PANELS

Snyder, Paul G., John F. Mandell, and Frederick J. McGarry
Report No. MITSG 73-18, Sea Grant Program, Massachusetts Institute of Technology, Cambridge, MA 02139 (Mar. 18, 1974), iii + 78 pp.

Ferro-cement has been found to be a desirable structural material for certain marine applications. True ferro-cement is considered to be a mesh reinforced mortar with a compressive strength of at least 400 kg/cm^2 (5,700 psi) and a specific surface K value (ratio of surface area of steel wire to the volume of the composite of ferro-cement) between 2.0 cm^{-1} (5.1 in^{-1}) and 3.0 cm^{-1} (7.6 in^{-1}). Ferro-cement has only limited applications as a structural material in marine applications because it is inferior in strength properties to the more familiar boatbuilding materials, fiberglass reinforced plastic (FRP), wood, aluminum, and steel. Normalized with respect to each of these materials' densities, the tensile strength, compressive strength, Young's modulus, flexure strength, and shear strength of ferro-cement are inferior. The advantages of using ferro-cement, which make it competitive for some applications, are ease of fabrication and lower tooling costs; furthermore, unskilled labor can be used for most of the process. These advantages are applicable only to construction of one or two hulls at a time. To produce hulls on a continuous basis, as much equipment is needed as for an FRP hull. Other advantages of ferro-cement hulls: they are the most fire resistant; they resist abrasion better than plastic and wood materials; they do not rot or corrode, and they are impervious to worms; and the strength of the mortar in the composite increases with time. The material is also adaptable to many complex shapes and

2.113

brushes and slip rings in not satisfactory. They should be cleaned and replaced if necessary. This arrangement requires zinc anodes or sacrificial steel plates to compensate for withdrawal of electrons from the hull.
[1 illustration] SW



2.117

is easy to repair. The low strength of ferro-cement limits its applications to displacement type hulls, work boats, barges, and sailing vessels. The material cannot be used in lightweight, high performance hulls. Quality control in manufacture is a serious problem and there is a lack of nondestructive testing techniques.

Investigations were performed with the objectives of improving the impact resistance of ferro-cement, to make it more suitable as a hull structural material, and to make it more competitive with other materials for hull construction. The results of the experiments indicate that a composite structure made up of a laminate of ferro-cement and rubber has substantially higher impact strength than ferro-cement alone. Such an improvement is possible while maintaining the other advantages of the ferro-cement construction. In addition, criteria and procedures were devised during the investigation which were efficient and useful in measuring the impact resistance of conventional or modified ferro-cement structures.
[17 figures, 5 tables, 32 references] SW

2.114 EVAPORATION OF SEA WATER

Tsukamoto, Teruyoshi (Ebara Infilco Co., Ltd.) (pat.)
Japan. 73 34,112 (Oct. 18, 1973)
Chemical Abstracts 80, No. 22, 124554e (June 3, 1974)

2.06 PRESSED MEAT PRODUCT

Taiyo Fishery Co., Ltd. (pat.)
Japanese Patent 74 00499
Food Technology 28, No. 6, 99 (June 1974)

Comminuted fish (beef, pork, or poultry meat) is mixed with salt and heated in water at a temperature below the coagulation point to form protein bonded meat bodies. [A copy of the Japanese patent, in the original language, may be obtained from L. Janowski, 18 Edgewater Dr., Dover, MA 02030 U.S.A. Price $2.50.] FTP

2.113 CORROSION-INHIBITING COATING OF ROUND-SECTIONED HEAVY-DUTY CHAINS

Clarus, Carl (pat.).
German Offen. 2,231,186 (Jan. 17, 1974)
Chemical Abstracts 80, No. 24, 135042n (June 17, 1974)

2.113 CORROSION OF HEAT EXCHANGER TUBES EXPOSED TO BALTIC SEA WATER

Arvesen, J., and S. Henrikson (Stiftelsen Varmetek, Forsk., Studsvik, Sweden)
Chemical Abstracts 80, No. 22, 124527y (June 3, 1974)

2.06 [PASTEURIZED PASTE FROM ALASKA POLLOCK EGGS]
PASTERIZOVANNAYA PASTA IZ IKRY MINTAYA

Entel', L. Ya., L. G. Boyarskaya, and T. I. Andreeva (TINRO, Vladivostok, U.S.S.R.)
Rybn. Khoz. 10, 73 (1973) [In Russian]
Aquatic Sciences & Fisheries Abstracts 4, No. 5, 253, Abstract No. 4Q5249M
(May 1974)

A high-quality paste from Alaska pollock eggs was produced. The technology of production and the chemical characteristics of the paste are described in the article. SW

2.148 THE INFLUENCE OF METEOROLOGICAL FACTORS ON FISHING EFFICIENCY IN THE BALTIC

Manikowski, Stanislaw
Reports of the Sea Fisheries Institute 17, Series A, 89-103 (1973). Sea Fisheries Institute's Publication Centre, Gdynia, Poland [In Polish, English summary]

The results of the short-term effects of weather on fishing efficiency were reported. The fishing grounds, types of fishing boats, and types of fishing gear (trawls) were analyzed in relation to weather over a period from April to October. The days when there were less than five fishing boats were omitted. The factors used in the analysis include wind direction and speed, visibility, current, weather in the past 6 hours, air pressure and tendency, amplitude of air temperature, amplitude of dew point, amount of clouds, amount of stratus and cumulus type clouds, and height of cloud base.

With the pelagic pair trawl the increased catch of sprat was correlated with high air pressure, light east winds, and with a high cloud base during the trawling operations preceded by strong winds 3 to 4 days before trawling. Using trawl or pair trawl, herring catch increases correlated with a large amount of low-based clouds, strong west winds 2 to 4 days before trawling, and a tendency for reduced air pressure 4 days after fishing. Increased catches of cod in trawls correlated with poor visibility and large amounts of clouds 3 to 5 days before fishing followed by high air pressure 4 days after fishing.
[1 figure, 14 tables, 30 references] SW

3. (2.06) SUPERCHILLING--A NEW APPLICATION FOR PRESERVING FRESHNESS OF FISH FILLETS DURING MARKETING

Nowlan, Sandra S., W. J. Dyer, and R. A. Keith (Dept. of the Environment, Fisheries, and Marine Service, P.O. Box 429 Halifax, Nova Scotia B3J 2R3, Canada)
Canadian Institute of Food Science and Technology Journal 7, No. 1, A16-A19 (1974)

The storage life of fresh fillets will be increased by any treatment that inhibits the growth of bacteria. Preservatives used in the past, such as antibiotics and nitrite, may be prohibited as additives by regulatory agencies. Other additives and irradiation are not effective preservatives in maintaining the quality of stored fillets. An effective treatment for inhibiting bacterial spoilage called superchilling was developed by E. Scarlatti [Fish Handling and Preservation. OECD, Paris, p. 57 (1965) and Freezing and Irradiation of Fish. Fishing News (Books) Ltd., p. 127 (1969)]. By this method round fish are maintained in good condition on the vessel for 20 to 30 days compared to about 14 days if stored in ice. In the superchilling technique, fish are stored at temperatures slightly cooler than ice in the range -1° and -4° C (30° and 25° F.). At -1° C, one-fifth of the water in the fish muscle is frozen; at -1.6° C, one-half is frozen; and at -4° C, three-quarters of the water is frozen.

The superchilling technique for vessels was adapted by the authors to preserving the quality of fillets during transport from the processing plant to the consumer where a travel period of several days was necessary. In a series of experiments, small samples of fish muscle were held at -1°, -1.6°, -2.3°, -3°, and -4° C for 3 to 6 days and then brought up to +5° C and stored at this retail

2.3 (0.12) FORMULATION OF SLABS OF FROZEN FOOD MATERIAL

Williams, Thomas A.; assignor to Unilever Ltd., London, England (pat.)
Canadian Patent 944,605
Patent Office Record (Canada) 102, No. 14, 1168 (Apr. 2, 1974)

Fish material is extruded directly into a spray of a liquified gas (such as Freon) to produce a uniform extruded ribbon of material, which is then subdivided. FTP

3.12 FISH PRESERVATION

M. & H. Stemmler G.m.b.H. (pat.)
German Patent 2,220,685
Food Technology 28, No. 6, 99 (June 1974)

Fresh fish are preserved by spraying or immersing them in an acetylated distilled monoglyceride; the fish are then stored at 1°-4° C. FTP

3.2 [FROZEN CULINARY PRODUCTS FROM FISH OF LOW MARKET VALUE]
ZAMOROZHENNYE KULINARNYE IZDELIYA IZ RYB PONIZHENNOJ TOVARNOJ TSENNOSTI

Losєva, A. V., and A. F. Didenko (TINRO, Vladivostok, U.S.S.R.)
Rybn. Khoz. 11, 72-74 (1973) [In Russian]
Aquatic Sciences & Fisheries Abstracts 4, No. 5, 253, Abstract No. 4Q5252M (May 1974)

The technology and procedures are given for the manufacture of frozen cutlets, round rissoles (cakes), and quennelles (balls) from the meat of Alaska pollock, putassu, and grenadier. The yields of meat (and its chemical composition) from each of the species is given. SW

3.238 FOOD ADDITIVES. ADHESIVES

Anonymous
Food Drug Adm., Washington, D.C.
Chemical Abstracts 80, No. 25, 144450w (June 24, 1974)

3.6 (3.335) UTILISATION OF TRASH FISH. II. STUDIES ON PREPARATION OF FISH SOUP MIX

Venugopalan, V., and M. A. James (Central Inst. of Fisheries Tech., Ernakulam, Cochin-11, India)
Fishery Technology 6, No. 2, 148-152 (1969)
Food Science and Technology Abstracts 6, No. 3, 163, Abstract No. 3R164 (Mar. 1974)

In the preparation of a soup mix, mixed trash fish composed mainly of kilimin (Synagris spp.), jew fish (Otolithes spp.), and silver bellies (Leiognathus spp.) were cooked, and the meat was separated and deodorized. The meat was homogenized with an equal volume of water; ingredients such as salt, fried onion, beetroot, and starch were added; and the mixture was boiled for 5 min. The mixture was placed in aluminum trays and dried at 70° C. for 5-6 hr. The dried material was powdered, mixed with sweetener and preservatives, packed in polyethylene-lined aluminum bags, and stored at 37° C. The chemical changes such as the browning reaction, oxidation, and microbiological changes were investigated. The results indicated that the preparation from trash fish, containing about 25% protein, can be used as food. The mix can be prepared for serving by boiling a 5% suspension for 1-2 min. The beetroot gave a pale rose color to the product. Storage studies were conducted, and the results indicated that the soup mix, with a moisture content of 6.1%, has a shelf life of 4 months at ambient temperature (28°-31° C). SW

2.149 SOME ABC'S OF FO'C'SLE LIVING

Larssen, A. K. (Fishermen's News, Seattle, Wash.), and Sig Jaeger (University of Alaska and University of Washington Marine Advisory Program)
Marine Fisheries Review 36, No. 6, 1-38 (June 1974)

The work and life aboard a fishing vessel in the Pacific Northwest are described in this article. The sections of the report are as follows: Want to be a fisherman? , Living in the fo'c'sle, Glossary, Your outfit, On duty in the pilot house, Working on deck, Responsibilities, The hold, Your medical rights and care, Bits and pieces, How do you get paid?, Shore leave, and Conclusions. FTP

2.119 INFLUENCE OF FUELED AND VENTILATION PARAMETERS ON SMOKE AND TOXIC GAS PRODUCTION IN ENCLOSED SHIPBOARD FIRES

Corlett, Richard C., Gregory Cruz, Tai I. Yu, and Joseph H. Koo (Dep. Mech. Eng., Univ. Washington, Seattle, Wash.)
Chemical Abstracts 80, No. 22, 122949p (June 3, 1974)

3. (2.06)

cabinet temperature to determine storage life. Samples were considered spoiled when trimethylamine nitrogen (TMA) reached 10 mg/100 g fish muscle and hypoxanthine (Hx) 2.5 μM/g fish muscle. The results show that superchilling increased the storage life of the fish muscle over that obtained by icing, and the maximum increase occurred with fish muscle maintained at the superchilling temperature of -4° C for 6 days. Increases in free fatty acids during superchilling were similar to those in iced fish muscle. Fish muscle kept at -4° C (and not brought up to +5° C) maintained better quality after 18 days; the iced samples spoiled in 10 days. Test panel assessments of samples superchilled at -4° C indicated no deterioration of flavor and texture. Drip formation after thawing was 5% compared to 3% for iced samples. Polyphosphate and brine dips can reduce drip to 1%. No deleterious effects on quality occurred when the samples were cooled rapidly to an internal temperature of -30° C before superchill storage at -4° C.

In tests to determine the effects of superchilling in a commercial operation, 10-lb boxes of top quality cod fillets were plate frozen to -20° C and allowed to thaw at 0° C for 2 days and for 1 day at +3° C. When these fillets were finally stored at +5° C., the keeping time was 2 days longer than for fillets in an iced 80-lb pack.

The superchilling technique eliminates the bulk and mess of ice, offers greater versatility in shipping than icing, allows existing plant equipment to be used at the reduced temperatures, and results in longer storage life for the fish marketing industry. Superchilled fish cannot be labeled either as "fresh fillets" or "frozen fillets." They could be marked; for example, as "cod fillets" and sold from the fresh fish counter. It might be preferable, to avoid possible deception of the consumer, to have official approval of a name such as "frosted fillets." [6 figures, 18 references] MS

4.9 (0.7) MODIFICATION OF FOOD TO CONTROL FAT INTAKE

Babayan, Vigen K. (Stokely-Van Camp, Indianapolis, IN 46204)
Journal of the American Oil Chemists' Society 51, No. 6, 260-264 (June 1974)

Atherosclerosis and obesity are giving concern. The causes of heart and vascular diseases are not known, and the effects of dietary saturated and unsaturated fatty acids are questionable. The causes of obesity have also not been established. Nutritonal education can enlighten the public regarding a balanced diet, and limiting caloric and fat intake is suggested to reduce obesity and control the deposition of cholesterol. In limiting fat intake several actions may be taken. Meat animals may be bred or fed to limit deposition of fat in the carcass; trimming fat from meat cuts is also suggested; peanuts may be defatted rather than dry roasted; low fat milk has found acceptance by the consumer; diet margarines and salad dressings containing substantially reduced proportions of fats are also available. Foods are being manufactured with larger proportions of polyunsaturated fats in the formulations. One of the new areas of food technology is the preparation of fats which have a low tendency to be deposited as depot fats. These fats are of medium chain lengths. Medium chain triglycerides enter the blood stream rapidly and are oxidized and metabolized rapidly to CO_2. In contrast, corn oil is very slow in absorption and is also oxidized and metabolized slowly. Animals fed medium chain fats have consistently shown 40%-50% lower cholesterol levels than animals fed lard or corn oil. Other fats combined with a polyglycerol are called polyglycerol esters. These fats look and taste

4.91 (0.7) LONG-CHAIN MONOETHYLENIC AND OTHER FATTY ACIDS IN HEART, LIVER, AND BLUBBER LIPIDS OF TWO HARBOR SEALS (PHOCA VITULINA) AND ONE GREY SEAL (HALICHOERUS GRYPUS)

Ackman, R. G., and S. N. Hooper (Dept. of the Environment, Fisheries and Marine Service, Halifax, Nova Scotia, Canada)
Journal of the Fisheries Research Board of Canada 31, No. 3, 333-341 (Mar. 1974)

Earlier work has shown that continuous exposure of weanling rats and juvenile animals of other species to high dietary levels of docosenoic acids ($C_{22:1}$) leads to temporary lipidosis (fatty deposits) in the cardiac muscle. In the rat the condition normally regresses, but later necrotic lesions may appear. These results do not necessarily indicate a specific hazard to human health; however, as a precautionary measure, the docosenoic acid content of edible fat and oil products has been limited to 5% in Canada. The seals ingest docosenoic acid and eicosenoic ($C_{20:1}$) acid on an irregular or continuous basis. The purpose of the present study was to examine the results of ingestion of these acids by larger animals (such as seals) as part of their normal diet. This paper is a report on the lipids and fatty acids of the hearts of three seals of different ages in comparison to the liver phospholipids and blubber triglycerides to determine if the deposition of $C_{20:1}$ and $C_{22:1}$ acids occur in any established pattern. The three seals consisted of one gray seal aged 3 months and two harbor seals aged 10 months and 23 months, respectively.

The fatty acids of the triglycerides in the hearts from the gray seal and two harbor seals showed quantitative differences in some details from those fatty

4.9 NUTRITIONAL SIGNIFICANCE OF RESIDUAL LIPIDS IN FISH MEAL

Opstvedt, J. (Norwegian Oil and Meal Industry Research Institute, 5033 Fyllingsdalen, Norway)
Feedstuffs 46, No. 23, 22, 27-28, 31 (June 10, 1974)

Fish meals contain about 12%-15% total lipids of which about 50%-80% is nonpolar lipid and 50%-20% polar lipid. Fish meal lipids are relatively high in polyenoic fatty acids of the ω3 type. Oxidation decreases the level of polyenoic acids, and in this state, less lipid is extractable by polar solvents.

Fish meals are highly digestible (about 90%) for farm animals; the energy value of digested lipids ranges from 8.8 to 7.3 (kcal/g). Oxidation reduces the energy value of the lipids. The polyenoic fatty acids are deposited into the tissues of chickens fed fish meal. Apparently the polyenoic fatty acids in fish meal have a growth promoting effect in chickens deprived of essential fatty acids, and they are indispensable for fish.

When high levels of polyenoic fish fatty acids are deposited at high levels in the tissues of chickens, the meat may have a fishy off-flavor.

Oxidation of the lipids (such as in unstabilized fish meal) may reduce the protein quality of the meal.
[6 tables, 41 references] FTP

6.30 MEDICINAL PLANTS OF SAMOA. A PRELIMINARY SURVEY OF THE USE OF PLANTS FOR MEDICINAL PURPOSES IN THE SAMOAN ISLANDS

Uhe, George (Botany Dept., Univ. of Auckland, New Zealand)
Economic Botany 28, No. 1, 1-30 (Jan.-Mar. 1974)

The purpose of this preliminary survey of use of plants for medicinal purposes in the Samoan Islands was to pioneer the way for a more detailed study of specific plants and remedies. This paper contains a table indicating the local names, habits, descriptions, plant parts used, and uses of 154 species (146 angiosperms, 4 ferns, and 4 nonvascular cryptogam). Included was one species of algae (Samoan name Limu), a red seaweed growing on lava that was used for treatment for worms. Other species listed included various seashore vines, shrubs, and trees applied in a variety of medicinal uses.
[1 table, 15 references, appendix] FTP

4.9 (0.7) ROLE OF DIETARY FAT IN HEALTH

Jones, Richard J. (Pritzker School of Medicine, University of Chicago, Chicago, IL 60637)
Journal of the American Oil Chemists' Society 51, No. 6, 251-254 (June 1974)

Suggestions have been made for modifying the diet of adults with a view to minimizing the effects of atherosclerosis. The effects of the diet are designed to maintain optimum body weight and reduce the intake of cholesterol, saturated fatty acids, and total fat; in addition, intake of unsaturated fatty acids is increased. Reduction of serum cholesterol is considered important in reduction of arterial and heart disease caused by atherosclerosis. A diet containing polyunsaturated fatty acids was reported to beneficially affect the levels of serum cholesterol and triglycerides; clotting time, platelet aggregation, and platelet survival time; and clearance of particulate lipid in the blood. In contrast, the vitamin E requirement of animals on a high polyunsaturated fatty acid diet is increased. Another effect of this type of diet is the enhancement of ceroid (an aging pigment) production. This compound is found in irreversible lesions of the arterial wall. The consequences of high polyunsaturated fatty acid diet on body economy are not completely known and are beginning to be investigated. The author suggests that data available on modification of blood lipid patterns through dietary changes do not indicate that a major revision of the diet of a majority of the population is necessary.
[1 figure, 5 tables, 38 references] SW

6.31 DEVELOPPEMENT DE L'ALGUE M. PYRIFERA (L.) AG. SUR LES COTES BRETTONNES [THE GROWTH OF THE ALGA M. PYRIFERA (L.) AG. ON THE COAST OF BRITTANY]

Brand, J.-P., H. Etcheverry D., and R. Perez
Science et Pêche, No. 233, 1-15 (Feb. 1974) [In French]

An investigation was carried out to determine whether the highly productive brown alga Macrocystis pyrifera could be transplanted successfully to the French coast off Brittany as a source of alginic acid. The transplanting of the plant involved three steps: (1) the spores were cultured in the laboratory on nutritive media; (2) the young plants were transplanted to aquariums; and (3) the older plants were then transplanted in coastal waters. The amount of alginic acid derived from the seaweeds grown on the French coast corresponded to that extracted from seaweed grown off the coasts of California and Chile.
[17 figures, 1 table, 1 references] SW

6.32 STEROLS OF MARINE ALGAE

Safe, L. M., C. J. Wong, and R. F. Chandler (Coll. Pharm., Dalhousie Univ., Halifax, Nova Scotia, Canada)
Chemical Abstracts 81, No. 1, 1340v (July 8, 1974)

4.9 (0.7)

like conventional food fats and oils but contribute fewer calories. These new compounds, as aqueous emulsions, have a unique characteristic of giving a sense of eating rich creamy foods. These new products could be useful in controlling fat and caloric intake.
[5 figures, 5 tables, 25 references] SW

4.91 EFFECTS OF DIETARY DOCOSENOIC ACID UPON RATS IN COLD

Beare-Rogers, J. L., and E. A. Nera (Food Research Lab., Health Protection Branch, Dept. of National Health and Welfare, Ottawa, Canada)
Lipids 9, No. 6, 365-367 (June 1974)

Earlier work has shown that young rats fed docosenoic acid deposit excessive amounts of lipid in the myocardium and that rats fed rapeseed oil succumbed to cold stress more readily than did those fed corn oil. The purpose of the present study was to determine if any correlation existed between cardiac lipid accumulation and cold susceptibility. Six-week-old rats were fed rapeseed oil and subjected to cold at 4° C. These test rats had a higher mortality rate than those fed oils lacking or low in docosenoic acids. The high frequency of deaths of the rats coincided with the period of pronounced cardiac lipidosis. After the cardiac fat deposits had regressed, the animals survived as well as the control animals.
[1 figure, 2 tables, 13 references] FTP

4.91 (0.7)

acids of the triglycerides in the blubber. The level of $C_{22:1}$ fatty acid in the heart triglycerides was about one-half that in the blubber triglycerides. There was a higher proportion of $C_{20:1\omega11}$ fatty acid deposited in the heart than in the blubber; this indicated more active chain shortening from $C_{22:1}$ acid. The fatty acids of the phospholipids of the hearts and livers of the three animals also differed quantitatively in some fatty acids indicating organ-specific compositions. The 3-month-old gray seal had unusual levels of linoleic types of acids in the organ lipids and, furthermore, showed a curious enrichment in ω7 monoethylenic acids. These differences between the gray seal and the older harbor seals (ages 10 and 23 months) are probably due to differences in the diets.

A comprehensive table on the fatty acid compositions of the heart, blubber, and liver lipids of the gray seal and the two harbor seals is given.
[2 tables, 48 references] FTP

6.35 (2.9) INTESTINAL EFFECTS OF CARRAGEENANS IN THE RHESUS MONKEY (MACACA MULATTA)

Benitz, K.-F., L. Golberg, and F. Coulston
Food and Cosmetics Toxicology 11, No. 4, 565-575 (1973)
Food Science and Technology Abstracts 6, No. 3, 206, Abstract No. 3T148 (Mar. 1974)

The effects of native carrageenan from Chondrus crispus and the degraded form (of carrageenan) from Eucheuma spinosum on the intestinal tract of rhesus monkeys was investigated. The carrageenan was fed to the monkeys in their drinking water for 7-14 weeks. Native or undegraded carrageenan appeared bo be well tolerated by the monkeys, but ingestion of degraded carrageenan produced various degrees of ulceration and formation of granulomas. SW

6.54 FISH PROTEIN CONCENTRATE WITH IMPROVED EMULSIFYING PROPERTIES

Dingle, John R., Daniel J. Kennedy, and William J. Dyer; assignors to the Canadian Government (pat.)
Canadian Patent 944,606
Patent Office Record (Canada) 102, No. 14, 1168 (Apr. 2, 1974)

This fish protein concentrate is in an emulsifiable form suitable for use in foods. It is prepared by washing the fish muscle, treating the comminuted washed flesh in an alkaline sodium chloride solution, acidifying the dispersion to precipitate the protein, and extracting the precipitated protein to remove lipids and water. FTP

6.59 (0.5) PREPARATION AND EVALUATION OF A MICROBIOLOGICAL GROWTH MEDIUM FORMULATED FROM CATFISH WASTE PEPTONE

Beuchat, L. R. (Dept. of Food Science, University of Georgia, Agricultural Experiment Station, Experiment, GA 30212)
Journal of Milk and Food Technology 37, No. 5, 277-281 (May 1974)

A water-soluble, heat-stable peptone was extracted from the waste portions (head and skin) of channel catfish by enzymatic digestion. The two-step digestion process involved use of Bromelain (Miles Laboratories, Inc., Marschall Div., Elkhart, Ind.) at pH 6.8 (initial pH) and temperature of 50° C for 3 h, then use of Milezyme AFP at pH 2.8 (adjusted with HCl) and temperature of 50° C for an additional 3 h. Bromelain is a proteolytic enzyme preparation obtained from pineapple stems, and Milezyme AFP is an acid fungal protease. After the second digestion period, the mixture was heated to 80° C to inactivate the enzymes. The bones were removed mechanically from the liquified material. The digest was cooled to 2° C and the fat was skimmed off. Additional solid material was removed by centrifugation. The supernatant was adjusted to pH 6.8 (with 2N NaOH) and again centrifuged to remove solids. The supernatant was filtered and then concentrated in a low-temperature evaporator to a fourfold concentration. The liquid was freeze dried and finally pulverized to produce the catfish peptone.

The catfish peptone contained 89.02% protein (Kjeldahl N × 6.25), 10.42% ash, and 0.44% fat. It also contained all the amino acids that are demonstrated to be present at levels of 1% or higher in six other commercially available microbiological peptones (these six peptones were also used for comparative purposes in the present study).

7. INSTRUMENTAL ANALYSIS IN ENVIRONMENTAL CHEMISTRY-LIQUID AND SOLID PHASE DETECTION SYSTEMS

Stedman, Donald H., and Philip A. Meyers (Dept. of Atmospheric and Oceanic Science, University of Michigan, Ann Arbor, MI 48104)
BioScience 24, No. 6, 346-349 (June 1974)

This article is the second of two reviews on analytical methods applicable to environmental chemistry. The first article covered detection in the gas phase. This paper is a review of methods which depend upon detection in the liquid or solid phase.

Liquid chromatography has evolved into a powerful analytical separation technique for a wide range of organic compounds. There are four types available: ion-exchange, absorption, partition, and steric hindrance. These types separate materials on the basis of their chemical and physical properties. Material eluted from the columns is detected by ultraviolet (UV) absorption, change in refractive index of the solvent, or heat given off by adsorption onto detector-packing material. Infrared analysis of liquids involves scanning their absorption using pure samples held in cells. Solids are dissolved in a solvent such as carbon tetrachloride or carbon disulfide, if possible before analysis. They may also be ground in paraffin oil to form a mull or ground in potassium bromide to form a dry mixture which is pressed into a disk and is then scanned. Electron spin resonance and nuclear magnetic resonance are analytical techniques that are laboratory based and require expensive equipment. These methods are used to determine chemical structure information and are not suitable for the analysis of the complex

6.54 (6.89)(3.3343) PRODUCTION OF D-GLUCOSAMINE HYDROCHLORIDE (GAH) FROM FISH CANNING WASTE

Ingle, T. R., S. H. Vaidya, and M. U. Pai (Nat. Chem. Lab., Poona 8, India)
Research and Industry, India 18, No. 2, 54-56 (1973)
Food Science and Technology Abstracts 6, No. 3, 155, Abstract No. 3R124 (Mar. 1974)

Details are given of a laboratory study on the production of D-glucosamine hydrochloride (a rare sugar that is a valuable ingredient in the preparation of dietary formulations for infants) from the waste shells accumulating during the canning of prawns and shrimps. A process flow sheet is included. SW

7.

mixtures found in environmental analysis. In electroanalytical techniques the concentration of a compound in solution is detected by: its effect upon an impressed voltage; the effect on the chemical state of a compound while a current is passed through the solution; or the effect of the compound upon an electrode in the solution. In the techniques of neutron activation (NAA) and X-ray fluorescence, the sample is subjected to irradiation, and the subsequent energy dispersion of the emitted fluorescence is detected by a lithium drifted germanium detector. Both techniques require moderately expensive electronic readout equipment, and NAA requires a high neutron flux research reactor. Both methods can be used in air pollution studies of collected aerosols. Ultraviolet light and visible light methods are also used in analyses. The methods are dependent upon absorption spectrophotometry to measure the amount of absorbance of UV or visible light by a compound in solution.
[5 tables, 47 references] SW

6.35 (2.9) STUDIES ON CARRAGEENAN AND LARGE-BOWEL ULCERATION IN MAMMALS

Grasso, P., M. Sharratt, F. M. B. Carpanini, and S. D. Gangolli (British Ind. Biol. Res. Assoc., Woodmansterne Road, Carshalton, Surrey, United Kingdom)
Food and Cosmetics Toxicology 11, No. 4, 555-564 (1973)
Food Science and Technology Abstracts 6, No. 3, 206, Abstract No. 3T149 (Mar. 1974)

Carrageenan, obtained from many species of Rhodophyceae, is extensively used as a gelling agent in foods. In tests on guinea pig and rabbit, ulceration in the large intestine was produced by administering either the native (undegraded) or degraded forms of carrageenan. Observations suggest that man is not sensitive to carrageenan, and it does not have a role in the etiology of ulcerations of the gastrointestinal tract or of ulcerative colitis. SW

6.59 (0.5)

Catfish peptone and six commercial peptones were incorporated into media and evaluated as to their ability to support growth of certain microorganisms from 13 genera (7 bacteria and 6 fungi). The commercial peptones consisted of Bacto-Peptone (substrate is meat), Myosate (heart muscle substrate), Thiotone (animal tissue), Phytone (soya meal), Trypticase (casein), and XM-8 (Atlantic menhaden). The bacteria used were: Escherichia coli, Salmonella enteritidis, Vibrio parahaemolyticus, Pseudomonas fluorescens, Staphylococcus aureus, Streptococcus faecalis, and Bacillus subtilis. The fungi used were: Aspergillus oryzae, Neurospora sitophilia, Mucor hiemalis, Actinomucor elegans, Rhizopus oligosporus, and Saccharomyces cerevisiae. Catfish peptone supported luxuriant growth of the test organisms, and, on the basis of the accumulated dry cell mass weights produced by the organisms, the catfish peptone ranked third out of the total of seven peptones tested. The author suggests that catfish peptone is a potentially valuable ingredient for the formulation of growth and fermentation media for microorganisms.
[1 figure, 4 tables, 18 references] FTP

6.36 SEAWEED EXTRACTS OF POTENTIAL ECONOMIC IMPORTANCE

Sand, Ralph E., and Martin Glicksman (Anderson Clayton Foods, Richardson, Tex.)
Chemical Abstracts 80, No. 24, 135169j (June 17, 1974)

7.0 ANALYSIS OF BIOLOGICAL, CLINICAL AND ENVIRONMENTAL SAMPLES USING PROTON-INDUCED X-RAY EMMISSION

Walter, R. L., R. D. Willis, W. F. Gutknecht (Duke University, Durham, NC 27700), and J. M. Joyce
Analytical Chemistry 46, No. 7, 843-860 (June 1974)

X-ray induced X-ray emission (or X-ray fluorescence) has been used as an analytical tool and is being used increasingly in the field of environmental analysis. X-ray emission caused by particles, such as alpha particles and protons, has been used recently for analytical purposes. A comparison of X-ray emission techniques was carried out and the results suggest that proton induced X-ray emission has great potential as a rapid, efficient tool for trace analysis. The advantages of the particle method for inducing X-ray emission are due partly to the large cross section for characteristic X-ray production, and a single particle can induce several X-rays as it penetrates a sample.

In a technique that was developed by the authors, a 3-MeV proton beam of 2 to 150-nanoampere was used to induce X-ray emission from various biological and environmental materials such as mammalian tissue, body fluids, soil extracts, leaves, coal, fly ash, ion-exchange membranes, and proteins. The X-rays were detected by means of a solid state (Si Li) detector for the elements P through Pb. Linear response was demonstrated for Pb, Cu, Zn, Co, and Mn from 5 ng to more than 2 µg. The lower limit of sensitivity of about 200 picogram in the irradiated area was attained with the more responsive elements deposited on very thin substrates.

7.64 MICROBIOLOGICAL ASSAY OF VITAMINS OF THE B GROUP IN FOODSTUFFS

Bell, J. G. (Laboratory of the Government Chemist, Stamford St., London SW1 9NQ, England)
Laboratory Practice 23, No. 5, 235-242, 252 (May 1974) [United Trade Press Ltd., 42-43 Gerrard St., London W1V 7LP, England]

Methods are described for the assay of vitamins of the B group (nicotinic acid, riboflavin, pantothenic acid, biotin, thiamin, vitamin B_{12}, vitamin B_6, and folic acid) in various foods (cereals, meat, fish, dairy products, and vegetables). [1 table, 1 reference] FTP

7.51 AUTOMATED PROTEIN DETERMINATION WITH ION-SELECTIVE MEMBRANE ELECTRODES

Alexander, P. W., and G. A. Rechnitz (Dept. of Chemistry, State University of New York, Buffalo, NY 14214)
Analytical Chemistry 46, No. 7, 860-865 (June 1974)

A newly developed automated system for rapid protein analysis is described. Ion selective electrodes located in a continuous flow manifold respond to denaturation products of the reactions between a protein and denaturing agents such as silver nitrate, sodium hydroxide, or sodium chloride solutions. The potentiometric response of the electrodes is indicated on a pH recorder. Since the electrodes are sensitive to the sulfur containing proteins and their denaturation products, the peak potentiometric response is indicative of their presence in a biological fluid. This method provides sensitivity in the µg/ml range and is highly selective for determination of protein in serum at sampling rates of 20-60 per hour. The advantages of the method are: the cost of instruments is low, it is specific for sulfur groups, and interferences found in the Lowry and biuret colorimetric methods (due to nonprotein substances) cannot occur. A schematic diagram of the apparatus is shown and graphs of the electrical peaks of the electrode responses in various reactions are provided.
[11 figures, 5 tables, 21 references] SW

8.8 (0.5)(6.9) MICROBIOLOGY OF COMMON FEED INGREDIENTS USED BY THE POULTRY INDUSTRY

Singh, Suresh P. (Research and Laboratory Div., Rockingham Poultry Marketing Cooperative, Inc., Broadway, Va.)
Feedstuffs 46, No. 23, 30 (June 10, 1974)

Data are given for the total plate count, total mold count and presence or absence of coliforms and Salmonella for a variety of feed ingredients (dried bakery product, meat and poultry blend meal, menhaden fish meal, broiler starter-pelleted, broiler grower-pelleted, broiler finisher-crumbles, breeder mash, soybean meal, and corn gluten meal). Data are presented for 13 samples of menhaden fish meal tested in 1972 and 13 in 1973. Results for menhaden fish meal in 1972 and in (1973), respectively, were as follows: total plate count (thousands per gram), 24-300 and (8-200); total mold count (thousands per gram), 3-36 and (0-24); 3 and (2) positive samples for coliforms; and 0 and (0) positive samples for Salmonella. The author proposes a general guideline for the microbiological quality of the various feedstuffs and the guideline for menhaden fish meal was as follows: Total plate count, 100,000 per gram; total mold count 10,000 per gram; coliforms, maximum of 100 per gram; and Salmonella, none.
[2 tables] FTP

7.520 (6.195) DETERMINATION OF THE EFFICIENCY OF UTILIZATION OF LYSINE AND METHIONINE IN FISH MEAL FOR TURKEYS

Kelly, Mike, and L. M. Potter (Dept. of Poultry Science, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061)
Poultry Science 53, No. 2, 610-619 (Mar. 1974)

A modified assay procedure was developed for determining the availability of lysine and methionine from fish meal when added to diets of turkeys. The procedure was then used to determine available lysine and methionine in some menhaden fish meals. The biological assay developed was based upon the 5- or 6-day body weight gain of young turkeys when fed fish meal added to semipurified diets. Available lysine in eight menhaden fish meals were found to be 93±12% of that obtained by chemical assay; the available methionine was 83±11% of that obtained by chemical assay.

The authors believe that the assay diets developed in this study are applicable for the determination of availability of lysine and methionine in other protein containing feedstuffs. Also, the method permits the determination of the percentage of the amino acid in a protein that is available to the poult for growth. In addition, the procedure can be used to determine the amount of an available amino acid without first determining the total amount of that amino acid present. [10 tables, 9 references] FTP

8.8 (3.2497) PERFORMANCE OF FROZEN FOOD INDICATORS SUBJECTED TO TIME VARIABLE TEMPERATURE

Hayakawa, Kan-Ichi, and Yeong F. Wong (Rutgers University, New Brunswick, NJ 08903)
ASHRAE Journal 16, No. 4, 44-48 (Apr. 1974)

Response characteristics of six different types of frozen food indicators were tested by exposing them to time variable temperatures. The tests were carried out before and after the indicators were stored for 1 month at 107°±2.5° F. This storage treatment significantly altered the response characteristics and/or physical appearance of all the indicators except one type of the time-temperature integrators group of indicators.

The response reactions of time-temperature integrators were determined for their correlationships with the quality loss reactions of frozen food. From these data, a criterion was developed for selecting time-temperature integrators that produce data useful for monitoring postproduction handling of frozen food.
[5 tables, 16 references] FTP

7.0

The authors suggest that the technique is especially suited to rapid and economical analyses for several elements for mass screening in clinical and environmental materials. The data obtained on many samples of such materials is given in the article.
[19 figures, 16 references] SW

8.42 (1.21) [MERCURY IN CANNED ANCHOVIES]

Lopez Lamas, M., F. Bermejo Martinez, and F. Lopez Capont (Dept. of Quim. Analytica de la Fac. de Sci., Santiago, de Campostela, Spain)
Revista de Agroquimica y Tecnologia de Alimentos 13, No. 3, 470-475 (1973)
Food Science and Technology Abstracts 6, No. 3, 154, Abstract No. 3R118 (Mar. 1974)

The mercury level in semipreserved anchovies was determined by digestion of samples for 50 min. in a 1:1 mixture of sulfuric and nitric acids at 110° C, oxidation with $KMnO_4$, and reduction with $SnCl_2$. The product of the reactions was then subjected to atomic absorption spectrophotometry. The results showed that 26 samples of salt-cured anchovies and related species from various regions of Spain contained 0.05 to 0.17 p/m Hg. Mercury was not detected in anchovy stuffed olives and their brines. Anchovies used for stuffing olives contained Hg at a level of 0.2-0.11 p/m. The paper used during the drying of anchovies contained 0.24 p/m Hg. SW

8.53 COMPOSITION OF LIPIDS OF SEVERAL KINDS OF FISH

Lisovskaya, V. I., and A. G. Rudenko (Odess. Otd., Inst. Biol. Yuzhn. Morei, Odessa, U.S.S.R.)
Chemical Abstracts 81, No. 1, 1395s (July 8, 1974)

7.0 (9.19) RECENT DEVELOPMENTS IN THE ANALYSIS OF TOXIC ELEMENTS

Lisk, Donald J. (Pesticide Residue Laboratory, Food Science Dept., Cornell Univ., Ithaca, NY 14850)
Science 184, No. 4142, 1137-1141 (June 14, 1974)

Some recent analytical advances in the analysis of toxic elements are surveyed and their practical applications are discussed.
[1 table, 212 references] FTP

9. THE PRESENT STATE OF MARINE SCIENCE AND OCEANOGRAPHY IN THE LESS DEVELOPED COUNTRIES

Bello, Emmanuel (International Labor Organization, Geneva, Switzerland)
International Lawyer 8, No. 2, 231-241 (Apr. 1974)

Successful use of the sea requires a strong background of scientific capabilities. The degree of achievement by any nation in the field of oceanography is measured, in most cases, by the level of emphasis on basic or applied research. The author discusses the policy for the application of marine science and oceanography in the developing countries, their views on proposed training and education, the benefits from participation in the activities of the International Oceanographic Commission (IOC), and some observations on the training, education, and mutual assistance programs.
[37 footnotes] FTP

9.10 (9.6) ILLUSTRATED KEYS TO THE FRESH-WATER FISHES OF ALASKA

Morrow, James E. (University of Alaska, Fairbanks, Alaska)
Alaska Northwest Publishing Co., Box 4-EEE, Anchorage, AK 99509 (1974), 78 pp., $2.95 plus 50 cents for postage.

This handbook provides a simple means to identify any fish found in the fresh waters of Alaska, including the marine species that sometimes move into the mouths of rivers or go into the fresh waters to spawn. For each species of fish, there is a brief discussion of its range and an outline sketch showing its important features. As far as possible, technical terms were avoided. However, sometimes such terms had to be used, but the author provided a glossary of these technical terms.
[77 illustrations] FTP

9.11 OCEAN EFFECTS ON WEATHER AND CLIMATE

Adem, Julian (Instituto de Geofísica, U.N.A.M., Torre de Ciencias, 3er. Piso, México 20, D.F., Mexico)
Geofísica International 13, No. 1, 1-71 (1973) [Torre de Ciencias, 3er. Piso, México 20, D.F., Mexico]

In the atmosphere-ocean-continent system there are very complex interactions and feedback mechanisms. These are graphically shown in a schematic representation of the thermodynamical interactions of the ocean atmosphere system. The source of energy that feeds the system is solar radiation that depends upon the solar constant (the quantity of energy received by the earth) and upon the declination of the sun (the season). Part of this energy is absorbed by the atmosphere and part by the oceans and continents. In addition, there is radiation energy emitted at terrestrial and atmospheric temperatures. The atmosphere is also heated by condensation of water vapor in clouds and by heat given off by vertical turbulent transport from the surface of the oceans and continents. In the air, energy is transported horizontally by the winds. There is also a loss of heat in the upper layer of the oceans. Most of these interactions have been taken into account in the formulation of a thermodynamic model that was developed during the last 15 years. The application of this model to evaluate some of the large-scale long-term thermodynamic influences of the ocean on weather and climate is described in this paper.

The model was used in the Northern Hemisphere in January and July to evaluate the evaporation and sensible heat given off the surface of the oceans to the atmosphere and the storage of heat in the oceans as contributors to the atmosphere-

9.12 (1.7) AN INQUIRY INTO THE CAUSES OF SHARK ATTACKS

Klimley, A. Peter
Sea Frontier 20, No. 2, 66-76 (Mar.-Apr. 1974)

The motivations underlying shark attacks are difficult to determine, and the appropriate strategy toward an attacking shark has been a subject of controversy among bathers and divers. In the past, attacks by sharks were considered to be motivated by hunger. Recently a suggestion has been advanced that attack behavior may be triggered by the disruption of courtship activities or by intrusion into a shark's territorial area. Attack wounds often resemble bites by which a shark satisfies hunger; however, if the attacks were hunger motivated, the prey would be expected to be consumed partially or wholly. In some incidents this has occurred; often the evidence is inconclusive. In other cases, victims of shark attacks have lost only small amounts of flesh. The teeth marks found on the victim's swimming fins, and the injuries inflicted on the legs indicate that they could be made only by slashing movements of outstretched jaws rather than a vertical bite, The injuries suffered in this case required almost 1,000 stitches to close the wounds. The author suggests that hunger was not the motivating factor of this attack.

The strategy of divers should be to minimize their actions that would trigger attack behavior resulting from all possible motivations. Since a shark resembles other predators (such as the lion, wolf, and hawk) in exercising caution in picking the prey that it attacks, it will not attack an animal that can retaliate or is too difficult to catch. The shark can easily be attracted by playing the

9.1 (9.6) CHECK-LIST OF THE FISHES OF THE NORTH-EASTERN ATLANTIC AND OF THE MEDITERRANEAN VOLUME I AND II

Hurean, J. C., and Th. Monod (editors)
United Nations Educational, Scientific, and Cultural Organization, Place de Fontenoy, 75700 Paris, France (Sept. 1973), Vol. I, xxii + 683 pp.; Vol. II, 331 pp.

In 1965, under the auspices of UNESCO, a panel of experts was established to develop an extensive generic listing of fish in European waters. Under the guidance of a scientific committee consisting of the two editors and G. Krefft (Hamburg), J. Nielsen (Copenhagen), E. Postel (Rennes), A. N. Svetovidov (Leningrad), E. Tortonese (Genoa), and A. Wheeler (London) this catalogue was prepared and published. It gives definitive nomenclature and information on synonyms, distribution, eggs, larval and young stages, otoliths, and iconography with bibliographical references. The publication of the checklist is considered to be the first step towards a more comprehensive treatment of European fishes. The following brackish-water families are omitted: Esociadea (pikes), Umbridae (mud minnows), Cyprinidae (carp), Cobitidae (loaches), and Percidae (perches). Volume I includes the detailed checklist and introductory information; Volume II gives a bibliography of 5,000 references and two alphabetical indexes. One alphabetical index gives common names, the second index gives scientific nomenclature and synonyms at all taxonomic levels, (family, genus, subgenus, species, and infraspecies taxa). SW

9.12 (1.7)

sound recording of an easy to capture struggling fish. When a diver is in danger of being attacked, the shark is often acting in a predatory manner. The diver must be careful not to produce any stimuli that resemble those generated by prey animals such as sounds of milling fish, or body fluids and blood, or light reflected off fish swimming erratically. In experiments on attractants and repellents, sharks were found to detect extracts of fish in concentrations of 1×10^{-4} p/m. Human blood was detected by sharks in concentrations of 0.1 to 0.01 p/m; human sweat at levels of 1 to 2 p/m had a mildly repellent effect and urine had no effect at all. In other experiments, disturbed fish were reported to excrete chemical substances that triggered sharks into exhibiting feeding responses. Sharks also orient to low-frequency, erratically pulsed sounds. In consideration of this response, divers in the presence of sharks should move quietly and rhythmically. The breast stroke is the least attractive to sharks. Currents given off by the dissimilar metals in divers gear can indicate to a shark that he is unacceptable prey. An aggressive lunge at the shark may cause it to retreat because the diver is acting contrary to the sharks accustomed prey. Also, by not retreating, but by stretching his arms and appearing as large and as threatening as possible the diver will not resemble accustomed prey.
[8 figures] SW

9.1 (9.15) AQUATIC ANIMAL HEALTH

Prepared by the Subcommittee on Aquatic Animal Health, National Academy of Sciences National Academy of Sciences, Printing and Publishing Office, Washington, DC 20418 (1973), v + 46 pp. $3.00, paperbound.

The subcommittee made the following observations in this booklet. The increasing need for food and feed derived from the aquatic environment must be recognized. The resources of marine and freshwaters in the form of fish and shellfish are limited partly by manmade environmental degradation. Disease and kills also cause losses. Diseases of aquatic species is of concern because of the depletion of the resource and as a hazard to the health and nutrition of man. A discussion of the diseases and parasites of fish and shellfish is given, and a section is devoted to laws and regulations for disease control in the United States and internationally. The manpower and facilities available for aquatic animal disease control and investigation are believed to be inadequate and should be increased. There are 99 references in a concluding bibliography. SW

9.11

ocean-continent system. Computations of the response of this system to an initial anomaly in the surface ocean temperature of 2° C over all oceanic areas were carried out. The results indicate that important anomalies in the temperature fields, the heating functions, and the circulation of the atmosphere were generated, and these anomalies were dependent on the season. The author concludes that the ocean temperature is an essential variable for long-range prediction of the weather and for studies of climatic fluctuations.
[27 figures, 12 references] SW

9.11 (1.0113) OREGON'S NEARSHORE OCEAN

McCauley, James E. (Dept. of Oceanography, Oregon State University, Corvallis, Oreg.) S.G.No. 16. Oregon State University Extension Service, Marine Advisory Program. Corvallis, Oreg. (Nov. 1973), 8 pp.

9.12 (1.51) GROWTH OF NORTH SEA COD, GADUS MORHUA

Daan, N. (Netherlands Institute for Fishery Investigations, IJmuiden, The Netherlands)
Netherlands Journal of Sea Research 8, No. 1, 27-48 (May 1974)

In an earlier article, the author reported on the relation between consumption and production of North Sea cod. The objective of this present article is to provide additional information on the growth of North Sea cod. The information is based upon sampling fish sizes in markets, research vessel surveys, and data derived from tagging. The Bertalanffy model was selected to estimate growth patterns of the cod as applied by R. J. H. Beverton and S. J. Holt [Fishery Invest., Lond. 19, No. 2, 1-533 (1957)].

The growth rate appears to be lower in the cod of the northern North Sea than in cod of the southern North Sea, but ultimately cod in the northern North Sea reach longer lengths. This is due to better feeding conditions for the large cod in the northern North Sea. A higher growth rate in the winter among cod of the southern North Sea was suggested by analysis of the data; no pattern of seasonal change in the growth rate of cod in the northern North Sea was observed. The lengths of juvenile cod caught in research vessel operations were compared with the growth curves estimated from commercial size cod. The curves were found to underestimate real growth during the first year of life of the cod; from 1-year-old onward there was good agreement with the growth curves. Analysis of growth

9.15 INFECTIONS WITH PARASITIC COPEPODS IN NORTH SEA MARINE FISHES

Boxshall, G. A. (University of Leeds, Wellcome Marine Laboratory, Robin Hood's Bay, Yorkshire, England)
Journal of the Marine Biological Association of the United Kingdom 54, No. 2, 355-372 (May 1974)

A survey of the parasitic copepods occurring on fishes caught off northeastern England was carried out. The purposes of the survey were to determine the copepod parasites of as many species of fish as possible, to determine the range of host species parasitized, and to estimate numerical relationship between parasite and host. The survey was based on the examination of fishes caught within 40 miles of Whitby, Yorkshire, and landed at that port. The fish were obtained from either the laboratory fishing vessel or commercial fishing vessels. Plaice and flounders were caught for another study but were examined for copepod parasitism also. Infections with parasitic copepods were found in individuals comprising 41 species from a total of 62 species (representing 34 families) examined. The parasitic copepods found on the fishes consisted of 39 species belonging to 9 families. These data are given in a table which lists the common names of the fishes, body length, number of infected hosts, percent of hosts infected, and intensity of infection. The frequency distribution of host-parasite relationships was also investigated. One example given was the cod (Gadus morhua) infected

9.15 PRELIMINARY INVESTIGATIONS INTO THE SUITABILITY OF A NEW CHEMOTHERAPEUTIC, FURANACE, FOR THE TREATMENT OF INFECTIOUS PRAWN DISEASES

Delves-Broughton, J. (Lord Rank Research Center, Lincoln Rd., Cressex, High Wycombe, Bucks, England)
Aquaculture 3, No. 2, 175-185 (Apr. 1974)

Furanace is 6-hydroxymethyl-2-(2(5-nitro-2-furyl)vinyl)pyridine and is also referred to as P-7138 and nifurpirinol. It was developed specifically for the treatment of fish diseases by M. Shimuza and Y. Takase [Bull. Jap. Soc. Sci. Fish., 33, No. 6, 544 (1967)]. Furanace shows antimicrobial activity over a wide range of bacterial and fungal pathogens of fish and crustacea. At treatment levels, Furanace is nontoxic to the prawn Macrobrachium rosenbergii; the prawns readily absorb the drug, their tissues achieve effective drug levels, and they readily excrete the compound after treatment.
[2 figures, 5 tables, 7 references] FTP

9.15 (1.92)(9.6) DISEASES OF POND FISHES

Bauer, O. N., V. A. Musselius, and Yu. A. Strelkov
Translated from the Russian and published in pursuant to an agreement with the U.S. Bureau of Sport Fisheries and Wildlife and the National Science Foundation (1973), vii + 220 pp. Available from National Technical Information Service, Springfield, VA 22151, catalog No. TT72-50070.

Modern pond fishery involves high planting densities in rearing, foraging, and wintering ponds. The resulting closer contact between fish increases the risk of infections and invasive diseases. This book deals with the important infectious, parasitic, and noncommunicable diseases of pond fishes. Chapters 1 and 2 cover general information on pond fish diseases and methods to prevent or control them. Infectious diseases caused by bacteria, viruses, and fungi are described in chapter 3. Parasitic diseases comprise the largest category in the book and they are described in chapter 4. The disease organisms in this category include protozoa, infusoria, helminths, trematodes, and crustacea. Chapter 6 deals with noncommunicable diseases of fish such as alimentary and functional diseases, and those caused by deterioration of rearing conditions (asphyxiation and toxicoses). Diseases of unknown etiology are described in chapter 6, and chapter 7 covers methods of pathological examination of fish. In an appendix a table lists the principal drugs used in pond fishery. A bibliography gives references divided into Russian sources and non-Russian sources. SW

9.12 (9.11) MARINE STUDIES OF SAN PEDRO BAY, CALIFORNIA. PART IV. ENVIRONMENTAL FIELD INVESTIGATIONS

[various authors and titles]
Sea Grant Report USC-SG-2-74, Published by the Allan Hancock Foundation, and the University of Southern California, Los Angeles, CA 90007 (Feb. 1974), iii + 101 pp.

This Part IV contains four papers: "Abundance, Distribution, Seasonality, and Productivity of the Fish Populations in Los Angeles Harbor, 1972-73," by John S. Stephens, Jr., Catherine Terry, and Merrill James Allen, pp. 1-42 [20 figures, 6 tables, 15 references]

"A Checklist of Fishes from Los Angeles-Long Beach Harbors," by Dilworth W. Chamberlain, pp. 43-78 [1 figure, 6 references, 1 appendix]

"Primary Productivity in the Outer Los Angeles Harbor," by Mikihiko Oguri, pp. 79-88 [2 figures, 1 table, 3 references]

"Preliminary Investigations of Benthic Marine Algae From the Breakwaters Protecting Los Angeles and Long Beach Harbors," by Robert B. Setzer, pp. 89-101 [2 figures, 4 references]

Between May 24, 1972 and October 1973, 76 trawls were made in Los Angeles-Long Beach Harbors for a total of 57,646 fish. This amounted to an average of 738.5 fish per trawl, and, if larval fishes were excluded, the average was 423.2 (fish density of one fish per 8.9 square meters). There were apparently three areas of distribution within the harbor: an area high in flatfishes; an area high in croakers; and an area demarcated by the presence of rockfishes. Fewer fishes were present in winter than in summer. Estimated standing crop of fishes in the harbor is between 700,000 and 1,600,000 kg. The annual productivity is estimated at 392,000 to 896,000 kg (about 56% of the standing crop). This productivity represents 7.3 to 16.5 g/m^2. FTP

9.16 SUSPENSION-FEEDING AQUACULTURE SYSTEMS: EFFECTS OF PHYTOPLANKTON CONCENTRATION AND TEMPERATURE ON GROWTH OF THE BAY SCALLOP

Kirby-Smith, William W., and Richard T. Barber (Duke University Marine Laboratory, Beaufort, N.C.)
Aquaculture 3, No. 2, 135-145 (Apr. 1974)

The bay scallop Argopecten irradians occurs along the east and gulf coasts of the United States. Off North Carolina they live subtidally in beds of eel grass, and they spawn, settle, and grow to adult size within 1 year; they usually die during their second year. This paper reports on the growth rate of the bay scallop in relation to temperature and phytoplankton concentration.

The growth rates of the scallops were determined experimentally using holding tanks. Beaufort (N.C.) Channel water was fed continuously by a submersible pump into the tanks fitted with an overflow pipe. Four separate temperatures were maintained, 10°, 16°, 22°, and 28° C. The food available (phytoplankton in suspension) to the scallop (suspension feeder) was estimated by measuring chlorophyll a in suspension.

Results of these experiments suggest that normal variations in phytoplankton levels do not influence the growth rate of bay scallops in their natural habitat. Increasing the levels of phytoplankton above natural concentrations did not influence the growth rates of the scallops, but decreasing the phytoplankton levels resulted in a decrease in the growth rate of the scallops. Under extremely low phytoplankton concentrations, the bay scallops ceased to grow.
[4 figures, 1 table, 16 references] FTP

9.12 (1.51)

in the tagged cod showed that age readings from the cod otoliths was a reliable tool for growth studies. The article contains discussions on the problems of interpreting length-weight data. Estimated values of various parameters of the Bertalanffy growth curve used in the study are also presented.
[10 figures, 8 tables, 36 references] SW

9.15

with Clavella adunca. The majority of the cod examined were uninfected or carried small numbers of parasites; only a small proportion of the population examined carried a larger number of parasites of up to 10 per fish. Another conclusion drawn is that there was a gradual increase in the accumulation of the parasite Bomolochus confusus with increasing age in the fishes. The majority of copepod species were found to be parasitic strictly for a single host species. A table lists the species restricted to one host species and the fewer parasitic variations of specificity for more than one host species, genus, or family. Thirty-nine species of copepods are listed systematically with notes on the hosts and sites of infection. Another table lists the fish species that were free of infection from the parasites. The better known species in this group includes the sea lamprey, dogfish, sprat, herring, eel, hake, butterfish, and red gurnard.
[2 figures, 3 tables, 28 references] SW

9.15 RESOURCE AND LITERATURE REVIEW
DISSOLVED GAS SUPERSATURATION AND GAS BUBBLE DISEASE

Prepared by the Seattle Marine Laboratories (4122 Stoneway North, Seattle, WA 98103) for Northwest Utility Cooperative, c/o Idaho Power Company, Boise, Idaho (Oct. 1973), 1 + 60 pp.

This paper gives a review of the world and regional literature (published and unpublished) on the effects of supersaturated dissolved gases on aquatic organisms with emphasis on the Snake and Columbia Rivers. The causes of gas bubble disease, its symptoms and pathology, and the causes of gas supersaturation in water are discussed. There are 110 references given in the bibliography.
SW

9.11 (9.6) BIOLOGICAL OCEANOGRAPHIC PROCESSES

Parsons, Timothy R., and Masayuki Takahashi (Institute of Oceanography, University of British Columbia)
Pergamon Press, New York (1973), x + 186 pp. (paperback)

This book is intended to be an introduction to quantitative biological oceanography. In chapters 1 and 2 the taxonomic distribution of plankton and the chemical composition of these organisms and their marine environment are described. In chapter 3, the autotrophic and heterotrophic processes in the formation of the organic materials are discussed. Chapter 4 covers the production of plankton relative to nutrients and feeding processes. Chapter 5 contains descriptions of the biological cycles: carbon and energy cycles, inorganic chemical cycles, and organic compounds in the food chain. Chapter 6 gives practical problems in pollution and water mass identification and problems in the abundance of fisheries. A 22-page bibliography is given and a subject index is provided. SW

9.16 (9.17) NITROGEN SUPERSATURATION INVESTIGATIONS IN THE MID-COLUMBIA RIVER

Anonymous
Technical Report No. 12, Washington Dept. of Fisheries, Olympia, Wash. (1974), 153 pp.

The effects of spilling, at Chief Joseph Dam, on the downstream dissolved nitrogen saturation levels was tested at average spills of 20,300 cubic feet per second (cfs) to 205,600 cfs. Results of the tests demonstrated that spilling at the dam increased the downstream nitrogen saturation levels when the forebay (upstream water nearest the turbines) was near equilibration. Spill values of 60,000 cfs increased tailrace (water flowing from the turbines) nitrogen saturation by 10% while spills of 100,000 cfs or higher increased the saturation by about 20%. When the forebay was saturated at levels of 120% or higher, spills of about 200,000 cfs did not increase the downstream nitrogen levels. The following reports are devoted to the research accomplished on the causes, existing levels, and the effects of nitrogen supersaturation on salmonids.

"Effects of Controlled Spilling at Chief Joseph Dam on Dissolved Nitrogen Supersaturation in the Columbia River," by Thomas K. Meekin and Richard L. Allen, pp. 1-31. [2 figures, 15 tables, 3 references]

"Nitrogen Saturation Levels in the Mid-Columbia River, 1965-1971," by Thomas K. Meekin and Richard L. Allen, pp. 32-77. [11 figures, 21 tables, 7 references]

"Tolerance of Salmonid Eggs, Juveniles, and Squawfish to Supersaturated Nitrogen," by Thomas K. Meekin and Ben K. Turner, pp. 78-126. [9 figures, 15 tables, 9 references]

9.16 CONTRIBUTION TO A WORLD-WIDE INVENTORY OF EXOTIC MARINE AND ANADROMOUS ORGANISMS

Walford, Lionel, and Robert Wicklund (Sandy Hook Marine Laboratory, National Marine Fisheries Service, NOAA, Highlands, NJ 07732, U.S.A.)
FAO Fisheries Technical Paper No. 121, Dept. of Fisheries, Food and Agriculture Organization of the United Nations, Rome, Italy (Nov. 1973), iii + 49 pp. (Restricted distribution)

This review is a revision of a working document prepared for the Sixth Session of the Advisory Committee on Marine Resources Research in 1971. The material for the report was gathered from published literature and by correspondence. It deals with the scientific aspects of transplantation of exotic marine and anadromous organisms throughout the world. The contents include:

1. Foreword
2. Intentional Introductions (The Skaros Sparus cretensis; shad, striped bass, salmons and trouts, sturgeons, a North Pacific greenling; introductions of salmons, sturgeons, and mollusks in the U.S.S.R.; oysters)
3. The Hawaiian Islands--a case history of a carefully planned and well-documented program of introductions
4. The Bermudas--a fragmentary record
5. Unintentional Introductions (Introductions via canals, by ships, under the influence of artificially heated waters, with oyster plantings, of clams, and by aquarists)
6. Conclusions
7. Bibliography [340 references]

9.16 (1.0115) AQUACULTURE IN NEW ENGLAND

Gates, J. M. (University of Rhode Island), G. C. Matthiessen, and C. A. Griscom
Marine Technical Report Series No. 18, University of Rhode Island, Kingston, RI 02882 (1974), 77 pp.

In this report, the authors discuss the present potential for and the limitations on aquaculture in the New England region. The material presented is based on a survey of the literature and on discussions with personnel at research laboratories and private culture facilities.

Those species that appear to have the greatest potential for culture in the New England region are the American oyster, hard clam, bay scallop, American lobster, and silver (coho) salmon. The first four species are indigenous to the New England area and the silver salmon has been introduced experimentally into the area. The technology exists for culturing the five species through all stages of their life cycles to marketable sizes. Also, market demand for all species appears to be strong.
[26 tables, 176 references] FTP

9.17 (9.2)(9.6) MODELS IN ECOLOGY

Smith, J. Maynard (University of Sussex)
Cambridge University Press, London, England (1974), xii + 146 pp.

Ecological systems are defined by means of mathematical descriptions in this book. The author distinguishes between simulations which are descriptions with a practical purpose, and mathematical models useful in general ideas in ecology. The value of a simulation lies mainly in analyzing a particular case such as determining the number of fur seals that can be culled without threatening the population. Whereas a good simulation should include as much detail as possible, a good model should include as little detail as possible because it must make statements about ecosystems as a whole. Any ecosystem contains too many species which interact in far too many ways for a simulation to be a practical approach. In this book the numbers of individuals of different species are emphasized, an approach pioneered by V. Volterra [Mem. Accad. Nazionale Lincei (ser. 6) 2, 31-113 (1926)]. In addition, the book covers energy in ecology as considered by A. J. Lotka [Elements of Physical Biology, Williams and Wilkins, Baltimore (1925)]. In addition to the introduction, the major topics in the book include predator-prey systems, with and without age structure; breeding season and age structure; competition; migration; stability and complexity at various trophic levels; the statistics of populations; genetics and evolution; and territorial ecology. The book has a list of 53 references and concludes with a general index. SW

9.16 (9.19) [THE ACTIVATED SLUDGE PROCESS IN THE PURIFICATION OF EFFLUENT FROM FISH FARMS] DAS BELEBTSCHLAMMVERFAHREN ZUR REINIGUNG DES ABWASSERS AUS FISCHZUCHTANLAGEN

Knosche, R., and E. Tscheu (Inst. Binnenfisch., Zweigstelle Fangtech., Berlin-Friedrichshagen, German Democratic Republic)
Z. Binnenfisch. DDR 21, No. 1, 16-23 (1974) [In German]
Aquatic Sciences & Fisheries Abstracts 4, No. 5, 42 (Abstract No. 4Q4228F (May 1974)

Treatment of effluent from fish farms is expected to become more important as farming intensity increases and freshwater supplies are restricted. The activated sludge process was adapted to treating waste water from carp and trout ponds. Small size plants constructed of concrete or steel were proven adequate if they conform to the following capacities: space loading, 0.06-1.125 kg BOD_5 (biological oxygen demand after sample is incubated for 5 days at 20° C) per cubic meter per day; sludge loading, 0.05-0.3 kg BOD_5 per kg TS (total solids) per day at 1-5 g TS/l; and surface loading in the secondary sedimentation tank, 0.5-1 m/h. The activated sludge process was relatively stable even when drugs used to control fish diseases were present. SW

9.17 (1.25) TRENDS IN THE ABUNDANCE OF AMERICAN SHAD, ALOSA SAPIDISSIMA IN THE DELAWARE RIVER BASIN

Chittenden, Mark E., Jr. (Dept. of Wildlife and Fisheries Sciences, Texas A. & M. University, College Station, TX 77840)
Chesapeake Science 15, No. 2, 96-103 (June 1974)

The Delaware River Basin once provided larger landings of American shad than any other river system. The objectives of this article are to describe the historical and recent status of this fish in the Delaware Basin. Before 1880, the American shad was very abundant in the colonial period and the period after the Revolutionary War; however, few catch records exist. An early account in 1837 gave an estimated catch of 1.5 million fish. The main gear used was the haul seine. Abundance of the fish was not affected in the Delaware Basin by the large annual catch until dam construction began to restrict spawning grounds and nurseries in the Lehigh, Schuylkill, and upper Delaware Rivers. The annual commercial catch from 1890 to 1901 was reported to be about 11 to 17 million lb; however, this abundance level declined rapidly after 1901, except for a resurgence in 1907. The catch during the period 1904-1913 was about 3 to 5 million lb annually (except for 1907). Less than 0.5 million lb were caught in 1920. The decline in the fishery was attributed to pollution which interfered with successful seaward movement of young shad produced in the upper Delaware River and its tributaries. Abundance has remained low since 1920 although fluctuations have occurred. Records available for several years in the period 1890-1901 indicate that 39% of the total landings in the Delaware Basin originated in the freshwater of the Delaware River. This suggests that landings of shad at that time depended on Delaware Basin fish rather than fish originating in other coastal rivers.
[3 figures, 1 table, 43 references] SW

9.16 (9.17)

"Summer Chinook and Sockeye Salmon Mortality in the Upper Columbia River and Its Relationship to Nitrogen Supersaturation," By Thomas K. Meekin and Richard L. Allen, pp. 127-153. [9 figures, 2 tables, 8 references] SW

9.12 (9.6)

It is probable that an exotic species can succeed only at some expense to the populations of native species. From a human viewpoint, if the exotic species has qualities superior to those of the affected native species, the introduction is beneficial.

The successful introduction and establishment of an exotic species is probably irrevocable. Thus it would be desirable if the ecological consequences of any introduction could be accurately predicted. With every proposed introduction of an exotic species two questions must be considered: (1) What is the possibility that the exotic species can establish a self-sustaining population? and (2) If the species does become established, how will it affect the present value of seafood production?

[Although this report has restricted distribution, a copy may possibly be obtained from: FAO Fishery Data Center, Fishery Resources Division, Dept. of Fisheries, Via delle Terme di Caracalla, 00100 Rome, Italy]
[3 tables] FTP

9.16 TREATMENT OF WATER FOR AQUARIUMS

Baensch, Ulrich (pat.)
French Demande 2,183,248 (Jan. 25, 1974)
Chemical Abstracts 80, No. 26, 149015t (July 1, 1974)

9.16 METHOD AND APPARATUS FOR RAISING AND HARVESTING FISH

Gross, William R. (El Dorado, Kans., U.S.A.) (pat.)
Canadian Patent 945,845
Patent Office Record (Canada) 102, No. 14, 1437 (Apr. 2, 1974)

This system for raising and harvesting fish utilizes a closed loop for confining a body of water and a paddle wheel to create an artificial current in the body of water of sufficient magnitude to induce fish to swim against the current.
FTP

9.17 (9.3) STRATEGIES FOR INTERNATIONAL ENVIRONMENTAL ACTION: THE CASE FOR AN ENVIRONMENTALLY ORIENTED FOREIGN POLICY

Coan, Eugene V. (The Sierra Club), Julia N. Hillis, and Michael McCloskey (John Muir Institute for Environmental Studies)
Natural Resources Journal 14, No. 1, 87-102 (Jan. 1974)

The environmental movement is rapidly acquiring a worldwide perspective. In the United States, the environmental movement has undergone a gradual change from conservation based on esthetic considerations to concern with economic growth, irreplaceable genetic material, and the effects of pollutants on food chains and man. The international conferences and conventions on the human environment, ocean dumping, endangered species, and the wetlands are crucial beginnings and important first steps in global cooperation in matters of the environment. These conventions and agreements have emphasized studies and monitoring; however, they are unenforceable. Many environmentalists believe that the United States must move toward a new, ecologically oriented foreign policy that emphasizes global balances among population, resources, and environmental quality rather than ideological relationships among nations. Additionally, they believe worldwide deterioration of the environment threatens the national security in a deep and immediate sense. The pivotal role played by the United States (because many nations are influenced by U.S. policy directions) can be used to protect and improve the world environment. The United States could take unilateral action to protect the world environment. One area in which unilateral action would be beneficial is the prohibition of exportation of environmentally hazardous materials if their

9.17 (9.2)(1.0162) WEST AFRICAN MARINE FISHERIES: ALTERNATIVES FOR MANAGEMENT

Crutchfield, James A., (University of Washington, Seattle, Wash.), and Rowena Lawson (University of Hull, United Kingdom)
Paper No. 3, Program of International Studies of Fishery Arrangements. Resources for the Future, Inc., 1775 Massachusetts Ave., NW., Washington, DC 20036 (June 1974), xiii + 64 pp. $3.00, paperbound.

Most of the discussion in this report concerns the West African Coast bordering the east Central Atlantic Ocean--from Morocco to the Congo River. The coast from the Congo River to the east side of Cape of Good Hope is also discussed. The fisheries on these coasts are very complex and include artisanal canoe fishing with semi-industrial and industrial operations of African states in competition with shore-based and distant-water vessels of Asian and European origin. The rapid rate of expansion of modern industrial fishing operations has aroused concern for the state of the fish populations in this area.

The report is divided into four parts: the first contains descriptions of the oceanography of the region; a description of the fisheries, including the resources, the species, and the catch by country; consumption and marketing, covering demand for fish and international trade; and the state of the stocks. The second part covers the Southeast Atlantic coastal region and includes the oceanography, the fisheries, and the state of the stocks of the area. The third part comprises descriptions of the management of the West African Marine fisheries. In addition to covering management structures, the discussions include problems

9.19 (1.92) CHLORINATED INSECTICIDE RESIDUES IN THE EGGS OF SOME FRESHWATER FISH

Johnson, Lauren G., and Robert L. Morris (State Hygienic Laboratory, University of Iowa, Iowa City, IA 52240)
Bulletin of Environmental Contamination and Toxicology 11, No. 6, 503-510 (June 1974)

Other reports indicate that chlorinated hydrocarbon insecticides, used on row crops, were being carried into Iowa rivers by surface runoff. Furthermore, levels of dieldrin found in the flesh of channel catfish were two to five times greater than 0.3 p/m, the maximum allowable by the Food and Drug Administration (FDA) in fish for sale. The fish were caught in rivers draining areas under cultivation. Levels of dieldrin in other pan and game fish flesh, from all areas sampled in Iowa, were below the FDA limit. Because of the differences in dieldrin levels in the flesh of catfish and the other species, an investigation of the insecticide levels in the eggs of fish taken from five locations in Iowa was carried out. The locations are (1) the eastern branch of the Nishnabotna River; (2) the western branch of the river; (3) the Coralville Reservoir of the Iowa River; (4) pool 11 of the Mississippi River, near the northern border of Iowa; and (5) pool 19, near the southern border.

The eggs of fish taken from pools 11 and 19 contained polychlorinated biphenyls which were separated from the pesticide fraction by elution and the use of a silicic acid column. Gamma and alpha isomers of chlordane were separated from other pesticides, in samples of catfish eggs from the eastern Nishnabotna,

9.17 (9.2)(1.0162)

and objectives of management, ground rules of management relative to development, and national positions with regard to management. The fourth part contains discussions on the alternatives for management of these fisheries. The alternatives include international management. The various aspects of international and national management programs are presented. The authors suggest that an international management agency is needed to allocate the catch among the coastal states and to permit negotiations between individual coastal states and distant-water states to determine shares of an allowable harvest.

Fourteen tables give statistics on the fisheries of the region and a map shows the coastal states involved. SW

9.17 CONSERVATION DIRECTORY 1974 (9.6)

Clark, William E. (editor)
National Wildlife Federation, 1412 - 16th St., NW, Washington, DC 20036 (1974), x + 206 pp.

This book contains lists of organizations, agencies, and officials concerned with natural resources use and management. The lists include: U.S. Federal departments, agencies, and offices; international, national, and interstate organizations; state and territorial agencies and citizens groups; and Canadian Government agencies and Canadian citizen groups. SW

9.19 (1.92)

by a silica-gel column and successive elutions. The cleaned-up extracts were subjected to gas chromatography with electron capture detection.

The insecticides identified in the fish eggs were the same as those found in the flesh of fish taken from the same river locations in Iowa. Dieldrin was the major residue detected in the eggs, and the highest levels were in the eggs taken from those locations where the highest levels were determined in fish flesh and water samples reported by other workers. Channel catfish eggs were sampled at all five locations; the dieldrin levels were highest from the Nishnabotna River locations, and in descending order, Coralville Reservoir, pool 19, and pool 11. Of the fish taken at pools 11 and 19, walleye eggs had the highest lipid and dieldrin content; largemouth bass eggs had lower levels, and channel catfish eggs the least dieldrin and lipid content. The authors suggest a correlation between percent lipid and concentration of dieldrin in the fish eggs. The effects of dieldrin in fish eggs on reproductive success are not documented; however, Burdick et al. [Trans. Amer. Fish. Soc. 93, 127 (1964)] reported that levels of 4.75 p/m DDT in trout eggs produced at least 15% mortality in fry. The authors suggest that, because of its greater toxicity, dieldrin in fish eggs would have adverse effects at a level of 2.2 p.m.
[2 figures, 2 tables, 8 references] SW

9.17 (9.3) NORTH PACIFIC FISHERIES MANAGEMENT

Kasahara, Hiroshi, and William Burke
Paper No. 2 in the series, The Program of International Studies of Fishery Arrangements. Resources for the Future, Inc., Washington, DC 20036 (May 1974), xiv + 91 pp.

The purpose of this book is to place the fishery management problems of the North Pacific Ocean in the context of future exploitation and management including the impact of the United Nations Conference on the Law of the Sea (1974). In chapters 1 and 2, the status of exploitation of the North Pacific fisheries resources are discussed relative to the interests of the Pacific rim states. The disputes and agreements between these states are also examined. Chapter 3 covers the existing and expected fishery management problems in the area. Chapter 4 gives various alternative proposals in the negotiations on the law of the sea regarding fishery management, and chapter 5 covers the proposals for transforming the existing arrangements into a new comprehensive institution for fisheries management in the North Pacific Ocean. SW

9.17 (9.3)

use is forbidden in the United States. An example of such a material is DDT: its use is banned in the United States for the most part, but it may be exported. Import restrictions are already at work in the United States to prevent the destruction of endangered species. In addition, fisheries products from countries that do not practice conservation are prohibited from entry. The authors suggest that the United States undertake a variety of unilateral actions, from new regulations on exports and imports to a basic reorientation of foreign policy, to increase the magnitude of the U.S. impact on the environment of the world.
[42 references] SW

9.19 1973 POLLUTION CONTROL IN THE MARINE INDUSTRIES

Sullivan, Thomas F. P. (editor)
International Association for Pollution Control, 4733 Bethesda Ave., NW., Washington, DC 20014 (1973), vi + 400 pp.

The papers in this book were presented to the Third International Conference on Pollution Control in the Marine Industries held June 5-7, 1973, Montreal, Canada. The first section of the book is devoted to international policy; it contains four articles and the keynote address by Vladimir Baum of the United Nations. The articles cover policies of Canada, the United States, and the international community regarding pollution control; one article is a description of U.S. Coast Guard regulations and enforcement. The second section (six papers) deals with laws and regulations with descriptions of Canadian and U.S. regulations regarding pollution from ships, offshore oil and gas activities, and spills of oils and other toxic materials. The third section contains five papers on enforcement of pollution controls. The subjects include: the law of the sea in relation to pollution control; experiences of pollution control in the Great Lakes; enforcement of the law by the Canadian Government; and pollution control programs of the U.S. Navy. The fourth section covers, with six papers, waste management programs in seaports. The topics are on collection and processing facilities for commercial and recreational watercraft including handling of oily wastes. Other subjects in this group include ocean dumping, dredge disposal sites, pollution control planning for ports, and methods used in the Duluth-Superior Harbor in waste disposal from vessels. The fifth section is devoted to the Arctic marine environment with three papers. These papers give considerations on the environment relative to

9.19 (8.8) A KEROSENE-LIKE TAINT IN THE SEA MULLET, MUGIL CEPHALUS (LINNAEUS). I. COMPOSITION AND ENVIRONMENTAL OCCURRENCE OF THE TAINTING SUBSTANCE

Connell, D. W. (Sandy Trout Food Preservation Research Lab., Queensland Dept. of Primary Industries, Hamilton, Qld 4007, Australia)
Australian Journal of Marine and Freshwater Research 25, No. 1, 7-24 (May 1974)

A kerosenelike odor or flavor has been found in sea mullet captured off south Queensland. The taint was caused by a mixture of hydrocarbons closely resembling commercial keorsene in composition. The sea mullet apparently acquire the kerosenelike taint by ingestion of hydrocarbon containing sediments or absorption of hydrocarbons in water through the gills. Such sediments and water occurred in the area where the tainted fish were present; the sediments and water were contaminated as a result of discharge of hydrocarbon-bearing effluents in the vicinity
[8 figures, 1 table, 25 references] FTP

9.19 (9.14) EFFECTS OF CERTAIN FOOD ADDITIVES ON MERCURY ACCUMULATION, DISTRIBUTION, AND ELIMINATION IN SALMONID FISHES, AND THE RESULTS ON GROWTH

Menasveta, Piamsak (University of Washington)
A thesis submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy University of Washington, Seattle, Wash. (1974), xi + 144 pp.

Experiments were performed to determine the dynamics of mercury accumulation in fish in relation to diet and to investigate methods to decrease their uptake of mercury. Rainbow trout fingerlings were fed a basic diet plus orange peel or the trisodium salt of nitrilotriacetic acid (NTA) simultaneously with either mercuric chloride or methyl mercuric chloride. After a feeding period of 10 weeks the growth response was highest in those fish that had the highest concentrations of mercury; the least mercury-contaminated fish had the lowest growth response. In fish on diets containing orange peel, methylmercuric chloride accumulation was reduced about 50%; in fish on the NTA diet, methylmercuric chloride accumulation was reduced about 30%. These two additives reduced accumulations of inorganic mercury also. The fish required about 28 weeks to eliminate half the mercury accumulations. Most of the mercuric chloride that was absorbed accumulated in the head, bone, skin, and viscera of the fish. Most of the methylmercuric chloride accumulated in the muscle.

Another series of experiments was performed to determine the effects of various diets containing fish meal on the growth and mercury uptake of chinook salmon

9.19 (0.5) MICROBIAL PETROLEUM DEGRADATION: USE OF MIXED HYDROCARBON SUBSTRATES

Walker, J. D., and R. R. Colwell (Dept. of Microbiology, University of Maryland, College Park, MD 20742)
Applied Microbiology 27, No. 6, 1053-1060 (June 1974)

A comparative study was made of methods of examining hydrocarbons to estimate the microbial degradation of petroleum. The researchers demonstrated that gas-liquid chromatography with a mixed hydrocarbon substrate is useful in evaluating microbial potential for degradation of petroleum hydrocarbons.
[4 figures, 7 tables, 14 references] FTP

9.19 (9.14)

fry. The diets contained salmon; salmon with 2.5%, 5%, or 10% orange peel; Fisher meal diet; commercial fishmeal diet; fish scrap diet with oatmeal; fish scrap diet with wheat middlings; or 50% dogfish diet. Only the fish fed the commercial diet grew at a slower rate than fish on the other diets. Only the diet containing 10% orange peel retarded fish growth compared to fish on 2.5% and 5% orange peel. The diet containing marine fish waste had a slightly higher mercury concentration than the other diets; the marine fish waste diet caused the highest mercury uptake in the fish, and the commercial fishmeal diet caused the next highest mercury accumulations.
[35 figures, 38 tables, 120 references] SW

9.19 ANATOMICAL LESIONS CAUSED BY PARAQUAT IN SOME FRESH WATER FISH

Muscarella, A., and V. Galofaro (Ist. Patol. Gen. Anat. Patol. Vet., Univ. Messina, Messina, Italy)
Chemical Abstracts 81, No. 1, 440f (July 8, 1974)

9.19

marine industry and an analysis of a law to prevent pollution in Arctic waters. The sixth section covers, in three papers, equipment and services, economics of pollution damage, and impact statements for marine installations. The last section, containing four papers, deals with international developments in pollution control. Research and development in Canada, France, and the United States are described. SW

9.19 [RELATIVE TOXICITY OF FIVE ANIONIC DETERGENTS IN MARINE ENVIRONMENT. I. ACUTE TOXICITY TOWARDS FIFTEEN ORGANISMS]
NOCIVITE RELATIVE DE CINQ DETERGENTS ANIONIQUES EN MILIEU MARIN. I. TOXICITE AIGUE A L'EGARD DE QUINZE ORGANISMS

Maggi, P., and D. Cossa (Inst. Pêches Marit., Nantes, France)
Rev. Trav. Inst. Pêches Marit. 37, No. 3, 411-417 (1973)
Aquatic Sciences & Fisheries Abstracts 4, No. 4, 182, Abstract No. 4Q3838M (Apr. 1974)

The acute toxicity of five anionic detergents towards 15 marine organisms was investigated. The results indicate that fish are very susceptible, while crustaceans are the most resistant, to the effects of the detergents. The lethal concentrations of the detergents towards the fish were near 1 mgm per liter. SW

9.19 THE EFFECTS OF POLYCHLORINATED BIPHENYLS ON CALCIFEROL (VITAMIN D) MEDIATED CALCIUM METABOLISM

Wong, Richard G., Henry G. Nowicki, and Anthony W. Norman (Dept. of Biochemistry, University of California, Riverside, CA 92502)
Pesticide Biochemistry and Physiology 4, No. 2, 170-177 (June 1974)

The effects of acute PCB (polychlorinated biphenyls) treatment of chicks on calcium metabolism, particularly those mediated by calciferol, were examined. Rachitic chicks were given Aroclor 1254 and 1260 (PCB) at the rate of 1 mg per day for 7 days before intestinal calcium transport in vivo and in vitro, intestinal alkaline phosphatase activity, and bone calcium mobilization were assayed.

The normal calciferol-mediated increase in intestinal calcium transport (as measured in vivo and in vitro) was significantly inhibited by the PCB pretreatment. Intestinal alkaline phosphatase activity and bone calcium mobilization were not altered by the PCB pretreatment. The PCB intervenes in calciferol-mediated calcium metabolism in a different manner than that following DDT pretreatment in which both alkaline phosphatase and bone calcium mobilization responses are also inhibited. Thus, exposure to PCB may result in a potent antagonism of normal calcium metabolism and subsequent avian reproduction. The antagonism may be in part due to the interference with a number of calciferol-mediated biological responses. Reproductive failure attributed to PCB may not be tightly linked to thin eggshell syndrome, but is possibly associated with a delayed breeding response caused by increased hepatic metabolism of estrogen. A delay in this behavior response decreases the chance for survival of the young bird because the adults carry out their breeding in the season when food is most plentiful.
[5 tables, 49 references] FTP

9.19 (9.3)(9.6) THE INTERNATIONAL LAW OF POLLUTION

Barros, James, and Douglas M. Johnston
The Free Press, New York (1974), xvii + 476 pp.

Most forms of pollution are transnational and must be treated within a modern system of international law suitable to the needs of an interdependent world community in the late twentieth century. Part I of this book gives definitions, quality standards, and other information on pollution. In addition, pollution related public and private doctrines (including those on muncipal law) are discussed, and a suggested reading list is included. This part also covers seven decisions of the U.S. Supreme Court on pollution controversies beginning with the case of Missouri vs. Illinois and the Sanitary District of Chicago in 1903. Part II of the book contains a collection of international arrangements and agreements in the treatment of pollution problems. The treaties and results of arbitration involving pollution of international rivers and lakes are described. The trend toward international recognition of the need for protecting the oceans against pollution is suggested in this part through its coverage of the agreements between national states for this purpose. Information generated by the United Nations Conference on the Human Environment (1972) in Stockholm is also provided. Part III contains discussions of selected issues in world environmental law. These include international regulation relevant to the oceans, Antarctica, and outer space. This part also covers regulations relative to "ecocidal weapons" such as chemical, biological, and nuclear weaponry. In addition, treaties and laws designed for protection of radiation hazards are given.

Each major topic is provided with an additional reading list; the book also includes an index. SW

9.19 (1.88) OIL POLLUTION MONITORING IN THE LAGOON OF VENICE USING THE MUSSEL MYTILUS GALLOPROVINCIALIS

Fossato, V. U., and E. Siviero (Institute of Marine Biology of N.C.R., Venice, Italy)
Marine Biology 25, No. 1, 1-6 (May 7, 1974)

Venice is one of the main oil harbors of Italy and large oil storage facilities are located on its shores. Storm sewers and only partially treated industrial effluents also drain into the harbor. In addition, the waters of the harbor are in a continuous state of flux due to the tides. Freshwater and marine lamellibranch mollusks have been reported to be effective indicators of contamination by radionuclides, pesticides, and hydrocarbons. In this present study, the mussel M. galloprovincialis, a widely distributed filter feeder in the lagoon of Venice, was used to monitor hydrocarbon pollution in the harbor.

Whole mussels (minus shell and fluid) were treated to separate hydrocarbons from the lipids by saponification. After the addition of sodium chloride following saponification and centrifugation, the clear solution was extracted with n-hexane, neutralized with HCl, and dried. Gas chromatographic analyses of tissue extracts from mussels taken in various areas of the lagoon indicate the presence of a complex mixture of hydrocarbons. The source of these compounds is attributed to fuel oil contamination. Values as high as 22.0 mg/100 g mussel tissue were recorded in heavily polluted areas. The amounts of hydrocarbons found in most of the mussels in this area ranged from 0.8 to 8.7 mg/100 g mussel tissue.

9.19 EFFECTS OF RUBBISH HEAPS AROUND KEELUNG ON THE DISTRIBUTION OF PHYTOPLANKTON

Chiang, Young-Meng, and Rang Huang (Institute of Oceanography, National Taiwan University)
Acta Oceanographica Taiwanica No. 3, 235-244 (Dec. 1973)

Since the latter part of 1958 raw rubbish from Keelung City was used as fill along the coast between Keelung and Patoutzu. This paper is a report of the changes in the structure of the phytoplankton community caused by the pollution from this rubbish heap; a comparison was made of the structure of the phytoplankton community from other nonpolluted stations around Taiwan.

The phytoplankton of the Keelung-Patoutzu coastal area consisted mostly of diatoms; the dominant species were Chaetoceros didymus, Thalassionema nitzschioides, and Thalassiothrix frauenfeldii. In this polluted area a few species dominated the population, but in other nonpolluted areas a large number of species were found but none in excessively large numbers.

[2 figures, 1 table, 16 references] FTP

9.19 (1.87) EFFECTS OF CRUDE OIL ON THE FEEDING BEHAVIOUR OF THE LOBSTER HOMARUS AMERICANUS

Atema, Jelle, and Lauren S. Stein (Dept. of Chemistry, Woods Hole Oceanographic Institution, Woods Hole, MA 02543)
Environmental Pollution 6, No. 2, 77-86 (Feb. 1974)

Other reports on the effects of petroleum hydrocarbons on marine life indicated that the water-soluble fraction was the most harmful. In this present study on lobster feeding behavior, whole crude oil and the water-soluble fraction were used as the pollutants. Mature lobsters were housed in 100-liter fiberglass tanks containing water at 22° C. They were acclimated for at least 2 weeks before the experiment, and they were not fed. Eight lobsters were exposed to whole crude oil, eight to the water-soluble fraction of crude oil, and four were not exposed to either. The lobsters were fed a small piece of fresh mussel lowered slowly on a string into the tanks and the feeding behavior was observed. On the sixth day enough whole crude oil was added to the tank to make an oil-water ratio of 1:100,000. For the treatment with the water-soluble fraction, water circulated under the surface of crude oil in a separate vessel was recycled through the tank containing the lobsters; the oil-water ratio was calculated to be 1:100,000 also. In addition to observing feeding behavior, chemosensory aesthetasc hairs on the antennules of the lobster were examined for structural damage.

The results of the study indicate that the period between noticing food and making a move toward it increased twofold after the addition of whole oil. Lobsters exposed to the water-soluble fraction of crude oil showed no alteration of

9.19 (9.16) RESEARCH ON POSSIBLE DIETARY MERCURY POLLUTION IN FISH FARMING

Zanni, E. (Instituto di Chimica Agraria, Via Pietro Giuria, 15, 10126 Torino, Italy), S. Andruetto, E. Vigliani, and P. Ghittino (Inst. Zooprof. Sperim. Piem. Lig., Lab. Ittiopalologia, Via Bologna, 148, 10154 Torino, Italy)
Rivista Italiana di Piscicoltura e Ittiopatologia 9, No. 1, 7-12 (Jan.-Feb. 1974) [In Italian; English summary]

This work is a part of a study to determine the level of mercury pollution in fish farming systems, and observations made at a trout farm are reported in this paper. Analyses were made for the levels of mercury in trout feeds and their ingredients, in trout farm ponds, and in the farm-reared trout. Also, trout feeding tests were carried out using commercial feed containing 0.06 p/m of Hg, and also with diets containing 10 p/m of Hg in the form of inorganic ($HgCl_2$) or organic ($CH_3O\text{-}C_2H_4HgCl$) mercury compounds. The test diets were fed for 2 months. The level of mercury in the samples was determined by flameless atomic absorption spectrophotometry.

In 14 samples of trout feeds and their ingredients (sampled in Italy in 1972), the mercury level ranged from 0.01 to 2.68 p/m; a meat meal contained 0.14 p/m, and 5 fish meals showed a range of 0.07 to 0.51 p/m of mercury. Rainbow trout that had been maintained on pelleted feed containing 1.29 p/m Hg showed Hg level of 0.11 p/m in their intestine and 0.55 p/m in their liver. The pond sediment from a fish farm contained 0.16 to 1.15 p.m of Hg.

The trout fed a dry diet (presumably for 1 month) containing 0.06 p/m Hg showed a body level of Hg of 0.101 p/m. In the trout fed the test diet containing

9.19 (1.87)

chemosensory and feeding behavior. No changes in the morphology of the odor receptors after exposure to the oil was detected by light and electron microscopy. The authors suggest that small quantities of oil mixed with seawater act as a noxious odor to the lobster and cause decreased chemical excitability, depress the appetite, and increase the time necessary to find food. SW
[1 figure, 3 tables, 11 references]

9.19 (1.88)

The high values for hydrocarbons found in the mussels indicates a saturation limit for these organisms. Variations in the amounts of hydrocarbons found in the mussels corresponded to the distance from pollution sources. Mussels from the Adriatic Sea and less contaminated lagoon areas showed lower values for hydrocarbons
Evaluation of the data indicates a relationship between hydrocarbon levels in the lagoon waters and those in the mussels, and the authors suggest that the organisms may be useful as a monitoring index of hydrocarbon pollution. SW
[2 figures, 1 table, 13 references]

9.19 (9.16)

10 p/m of Hg in the inorganic form, the body level of Hg changed from 0.235 (initial) to 0.140 p/m; in those trout fed the organic form of Hg the body level of Hg increased to 1.807 p/m. A considerable amount of Hg was eliminated by way of the feces; the authors estimate the level of Hg in the feces was about 8.487 p/m.
In conclusion, it appears that Hg tends to accumulate more in the liver of the trout than in the flesh and that trout are able to eliminate considerable amounts of Hg. FTP
[7 tables, 17 references]

9.19 WATER POLLUTION

Hong, Se Uk (Coll. Pharm., Sung-Kyung Kwan Univ., Seoul, S. Korea)
Chemical Abstracts 80, No. 24, 137022e (June 17, 1974).

9.19 BIOLOGICAL METHODS FOR THE ASSESSMENT OF WATER QUALITY

Cairns, John, Jr., and K. L. Dickson (editors) (Virginia Polytechnic Institute and State University, Blacksburg, Va.)
American Society for Testing and Materials Publication 528, 1916 Race Street, Philadelphia, PA 19103 (1973), vii + 256 pp., $16.25.

The papers in this collection were presented at the Symposium on Biological Methods for the Assessment of Water Quality. The symposium was held at the 75th annual meeting of the ASTM in Los Angeles, Calif., June 26-29, 1972. The book can be used as a management tool to provide information on what is involved in making biological assessments of water quality, developing water pollution monitoring programs, and assessing the effects of potentially deleterious waste discharges in the aquatic environment. A state-of-the-art view of existing techniques and some historic perspective is also provided.
The papers in the book cover the use of fish, algae, aquatic invertebrates, and bacteria in the determination of pollution, monitoring of water quality, toxicity of waste effluents, and a possible alternative to the standard biochemical oxygen demand evaluation of water quality. SW

9.2 (9.7) FISHING BUSINESS MANAGEMENT & ECONOMIC INFORMATION

Smith, Frederick J. (Oregon State University Extension Service, Corvallis, Oreg.)
S.G. No. 6, Oregon State University Extension Service, Marine Advisory Program, Corvallis, Oreg. (Rev. June 1973), 6 pp.

9.2 UNDERSTANDING AND USING MARINE ECONOMICS DATA SHEETS

Smith, Frederick J. (Oregon State University Extension Service, Corvallis, Oreg.)
S.G. No. 24, Oregon State University Extension Service, Marine Advisory Program, Corvallis, Oreg. (Nov. 1973), 4 pp.

9.19 THE MICROBIAL DEGRADATION OF OIL POLLUTANTS

Ahearn, D. G., and S. P. Meyers (editors)
Publication No. LSU-SG-73-01, Center for Wetland Resources, Louisiana State University, Baton Rouge, LA (1973), vii + 322 pp.

This report is a collection of papers presented at a workshop, held at Georgia State University, Atlanta, Ga., Dec. 4-6, 1972, sponsored by the Office of Naval Research, the United States Coast Guard, the Environmental Protection Agency, and Georgia State University. The objectives of the workshop were to determine the status of knowledge on oil biodegradation by microorganisms and future areas of study; to promote cooperative research projects; and to facilitate exchange of information. Thirty-two papers were presented at the workshop; they are published in this volume with references. Lists of the panel participants, observers, and workers in the field of oil biodegradation are also included. The subjects of the papers include the activity of various microorganisms on petroleum spills; the effects of weather and temperature in various geographic locations on biodegradation of oil spills; the effects of oil spills on marine life, fish, and marshland ecosystems; and the effects of oil herders, dispersants, and bacteria on biodegradation of oil in seawater. SW

9.19 (9.6) BACKGROUND PAPERS FOR A WORKSHOP ON INPUTS, FATES, AND EFFECTS OF PETROLEUM IN THE MARINE ENVIRONMENT VOLUME I AND VOLUME II

Anonymous
Ocean Affairs Board, National Academy of Sciences, Washington, D.C. (1973), Volume I, pp. 1-374; Volume II, pp. 375-824.

These background papers were prepared for the workshop held May 21-25, 1973, at Airlie, Va. The objectives of the workshop were (1) precisely quantify the inputs of petroleum to the environment; (2) compare analytical techniques, chemical and biological, for quantitation and identification of petroleum in the ocean; (3) elucidate the fates of petroleum in the ocean; and (4) evaluate the high level effects of catastrophic spills on the coastlines. In Volume I, seven papers are given on the amount of petroleum entering the sea, and eight papers on analytical techniques. In Volume II, 13 papers are given on the chemical and biological fates of petroleum in the sea, 5 papers are given on chronic effects and 6 papers are given on acute effects on ecosystems, and 2 papers are given on the human health effects of petroleum pollution of the marine environment. SW

9.2 (0.8) ENERGY EQUIVALENTS OF NETWORK INPUTS TO FOOD PRODUCING PROCESSES

Leach, Gerald, and Malcolm Slesser
Booklet is available from Gerald Leach, 3 Tanza Road, London, NW3, England, or Malcolm Slesser, Dept. of Pure & Applied Chemistry, University of Strathclyde, Glasgow, Scotland (1973), 38 pp.

In the systems of food production, a number of material inputs are required. In economic analysis these are called network inputs; in energy assessments they may be called the energy equivalent of network inputs. In this article, the energy equivalents of the network inputs to food production are computed. The network inputs calculated include: fuels and machines such as natural gas and tractors, and fertilizer components such as potassium chloride, phosphoric acid, and ammonia. The energy expenditure required to transport the materials from the source to the place of use is not included in the calculations in order to be universally applicable. However, tables of transport energy required by airplanes, trains, trucks, barges, pipelines, and cars are included. The transport energy requirements can be added to the food-producing process energy requirements for each appropriate location. The authors did not submit this article to scientific journals for publication; instead, they made it available to anyone requesting a copy.
[28 tables, 27 references] SW

9.2 (9.3)(9.17) THE APPLICATION OF A MARKET THEORY TO THE REGULATION OF INTERNATIONAL FISHERIES

Kury, Channing R. (School of Law, University of New Mexico, Albuquerque, N.Mex.)
Ocean Development and International Law 1, No. 4, 355-368 (Winter 1974)

The relationship of ecology and economics to the political and legal foundations of international fisheries is discussed in this article. In addition, an argument is advanced for vesting fisheries management authority in a monopoly subject to the constraint that the stocks not be depleted beyond the point of economic repair. The criteria for choosing the management authority should be based upon the closest merging of ecological, economic, sociological, and political self interests. The reallocation of fishing effort by market dealings (rather than by governmental negotiations) carried out by the authority is visualized as a means to reduce international conflicts over fishing rights. One of the precedents for such a monopolistic authority is the attempt by the United States, in the Fur Seal Treaty, to extend jurisdiction over the harvesting of fur seals in American waters. The treaty recognized the interests of Russia, Canada, Japan, and the United States. By eliminating pelagic sealing and giving the other countries a share of the harvest, a careful maintenance of the seal herd has been achieved. The dangers to avoid in instituting monopolistic authority is that a government might take action to unjustly enrich itself by profit-generating license fees or enforce the regulations ineffectually. Other precedents and dangers are discussed by the author. [42 references] SW

9.19 (1.51) INVESTIGATION ON THE TOXICITY OF SEAWATER-EXTRACTS OF THREE CRUDE OILS ON EGGS OF COD (GADUS MORHUA L.)

Kühnhold, Walter W. (Institute of Marine Science at the University of Kiel, 23 Kiel, Düsternbrooker Weg 20, Federal Republic of Germany)
Berichte der Deutshen Wissenschaftlichen Kommission für Meeresforschung 23, No. 2, 165-180 (1974) [Summaries in English, German, and French]

The influence of the water-soluble fractions of petroleum on morphogenetic modification during embryonic development of cod eggs was examined. Three different crude oils were tested: Venezuela (Tia Juana), Iran (Agha Jari), and Libya (Sarir). Extracts of 0.1, 1.0, and 10.0 ml of petroleum per liter of seawater were made. The levels of dissolved hydrocarbons ranged from 0.015 to 3.5 p/m.

All results showed that extracts of Venezuela crude oil were more toxic than the other two crudes. Different development stages of the eggs exhibited different susceptibility to the oil extracts. The LC_{50} of the Venezuelan extract increased from 0.1 p/m for young eggs to more than 44 p/m for far-developed eggs. The mortality of the eggs caused by Iranian oil was proportional to the length of exposure and concentration of the extract. The strongest influence, measured by number and degree of deformation (of the embryos), was exerted with beginning of the gastrulation stage. Under the influence of low hydrocarbon levels, the embryo body can be fully developed with numerous vertebral column distortions. In addition to mortality, hydrocarbons retard the development rate. A variety of deformities was observed in addition to vertebrae distortions indicating that morphogenesis was disturbed. The blocking of metabolic pathways in the development process of the embryos inhibited successful hatching.
[6 figures, 5 tables, 22 references] SW

9.19 (1.32)(1.33) EFFECTS OF CRUDE OIL AND SOME OF ITS COMPONENTS ON YOUNG COHO AND SOCKEYE SALMON

Morrow, James E.
Ecological Research Series EPA-660/3-73-018, U.S. Environmental Protection Agency, Washington, DC 20460 (Jan. 1974), 37 pp. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. $0.85.

Young coho and sockeye salmon were exposed to crude oil from the Prudhoe Bay, Alaska, field. Oil poured on the surface of 95-liter aquaria produced significant mortalities in concentrations of 500 p/m or greater. Fish dipped into a film of crude oil or with a drop of the oil placed directly on each gill showed no significant mortalities. Fish that were force fed crude oil at 1 g per 100 g body weight showed no significant mortalities. Oil that had been exposed to air for 30 days also produced no mortalities.

Among oil components tested for toxicity on coho salmon, aliphatic compounds were not lethal. Monocyclic aromatics were toxic; the amount of toxicity increased with the degree of unsaturation in the molecule. The author suggests that the toxicity of these compounds is caused by their alteration of cell membrane permeability, especially in the gills. The alteration of permeability results in a rapid increase of monovalent ions in the blood and probably also interferes with carbon dioxide-bicarbonate ion regulation.
[20 tables, 10 references] SW

9.3 (1.953) INTERNATIONAL COMMISSION ON WHALING TWENTY-FOURTH REPORT OF THE COMMISSION

Anonymous
International Commission on Whaling, Great Westminster House, Horseferry Rd., London SW1, England (1974), 236 pp.

This is the report of the 24th meeting of the International Commission on Whaling held in London, England, in June 1973. It also contains reports presented at the Scientific Committee meeting held the previous week. Progress made by the Commission toward its goals were as follows:

The blue whale unit as a measure of catches was abandoned and the baleen catch limits were set separately by species. Reductions were made in the catch limits for whales in all areas, based on the latest assessments of the stocks by the Scientific Committee. Catch limits for the male and female sperm whales were fixed separately, and limits were imposed on sperm whaling in the southern hemisphere for the first time. Also, a catch limit was set for minke whales in the Antarctic although this resource is under-harvested.

The international observer scheme became operative in all areas where whaling is carried out by member countries. Although the Commission was not able to accept the resolution of the United Nations Conference on the Human Environment, at Stockholm (1973), for a complete moratorium on commercial whaling for 10 years, it did accept the recommendation to strengthen the Commission and to increase international research efforts. FTP

9.2 (9.19) THE ENVIRONMENTAL ECONOMICS OF THE SOVIET UNION

Bleyer, Bill (Hofstra Univ.)
American Economist 18, No. 1, 124-127 (Spring 1974)

Problems of the environment are indifferent to the economic systems employed by nations. The author briefly discusses some of the environmental problems of the Soviet Union and some of the steps being taken to resolve the problems.
[40 references] FTP

9.2 (9.6) YEARBOOK OF FISHERY STATISTICS. VOL. 34 CATCHES AND LANDINGS 1972

Anonymous
Food and Agriculture Organization of the United Nations, Dept. of Fisheries (1973), Vol. 34, xxii + 560 pp. Obtainable from FAO sales agents or Distribution and Sales Section, FAO, 00100 Rome, Italy. Price $12.00; £4.80; FF60.00

This book presents for the calendar year 1972 the annual statistics on nominal catches and landings on a worldwide basis by countries fishing, by species caught, and by major fishing areas. Included in the catches and landings are fish, crustaceans, molluscs, mammals and other aquatic animals, residues, and plants taken for commercial, industrial, and subsistence purposes by all types of fishing vessels in marine and freshwater areas. SW

9.3 THE USSR: OCEAN USE AND OCEAN LAW

Janis, Mark W., and Donald C. F. Daniel (Naval Postgraduate School, Monterey, Calif.)
Occasional Paper No. 21, Law of the Sea Institute, University of Rhode Island (1974), 22 pp.

The purpose of this paper is to illustrate the position of the Soviet Union in the law of the sea debates in relation to its ocean activities. Being one of the greatest beneficiaries of the traditional rules of international legal order of the oceans, the Soviet Union is reluctant to modify these rules. Because freedom of the high seas has been beneficial in the fields of strategy, economics, and research, the Soviet Union seeks no change in the rules. The proposed new rules providing for maximum limits to territorial seas and continental shelves and establishing free transit through straits improve the position of the Soviet Union. In contrast, proposals for increased coastal state jurisdiction or for supernational international oceanic authority would be inimical to use of the oceans and be resisted by the Soviet Union. Rather than broadening territorial seas, economic zones, or regional control, the Soviet Union would suggest preferential fishing rights and environmental regulations agreeable to all concerned states. The response of the Soviet Union to proposals for an international oceanic regime is (1) to suggest cooperation rather than direction, (2) to restrict the authority of the regime, and (3) to insist upon consensus in decision making. These positions would be taken by the Soviet Union to protect her interests as a great maritime power.
[66 footnotes] SW

9.3 DISPARATE FISHERIES: PROBLEMS FOR THE LAW OF THE SEA CONFERENCE AND BEYOND

Christy, Francis T., Jr.
Ocean Development and International Law 1, No. 4, 337-353 (Winter 1974)

There is wide variation in fisheries with regard to characteristics of the stock, the history of use, existing arrangements, and the interests of nearby coastal states and other states whose vessels come from distant waters. The search for a uniform international fisheries regime at the United Nations Conference on the Law of the Sea will be impeded by these variations in the different fisheries. This conclusion has emerged from a series of working papers of the Program of International Studies of Fisheries Arrangements being carried out by Resources for the Future, Inc. The working paper on the North Pacific shows that there is a small group of nations interested in the fisheries; most of them are industrially developed; and there is a long history of fishery agreements between them. However, for the West African area there are about 40 nations involved in the fisheries, about half of which are local, developing countries. The other nations in the fishery are industrialized and their fishing fleets come from distant waters. In these waters the fisheries are subjected to recent pressures; catches by the distant water states have increased about fivefold in the past 10 years. Most of the fish stocks in the Indian Ocean, except tuna, are not fully utilized and have not attracted fishing boats from nations outside the area. The tuna fisheries throughout the world are approaching the limits of maximum sustainable yields, but the number and size of vessels is increasing. The global

9.3 LAW OF THE SEA VI

[Authors and titles listed below]
San Diego Law Review 11, No. 3, 535 ff. (May 1974)

Card A

This is the sixth in the annual series of issues on the law of the sea. The various papers are as follows:

"Foreword," by Edmund S. Muskie, pp. 535-540. The author believes, relative to issues on the law of the sea, that accommodation is possible in the ocean, that a broadly agreed-upon and comprehensive international ocean regime can serve both the world's and the national interests, that the international community can bring stability and justice to the seas without compromising the security or the welfare of any nation with high stakes in the ocean, and that only concerted action will satisfy our collective interests in the ocean, calling for vision and statesmanship of the highest order. The author briefly discusses the four basic areas of the issues before the Third United Nations Conference on the Law of the Sea, Caracas, Venezuela, 1974): the territorial sea and rights of passage, economic zones, the deep seabed, and protection of the ocean environment.

"Boom, Doom, and Gloom Over the Oceans: The Economic Zone, the Developing Nations, and the Conference on the Law of the Sea," by Elisabeth Mann Borgese (Center for the Study of Democratic Institutions), pp. 541-556. The author discusses the conflicting claims of development, environmental control, and national interests and suggests ways toward reconciliation of the various conflicting viewpoints in the Conference. [13 footnotes]

"The Patrimonial Sea or Economic Zone Concept," by Andrés Aguilar M. (McGill University, Montreal, Canada), pp. 579-602. The author describes the economic

9.3 LAW OF THE SEA VI

[Authors and titles listed below]
San Diego Law Review 11, No. 3, 535 ff. (May 1974)

Card B

"Recent Developments in the Law of the Sea V: A Synopsis," by Dennis L. Greenwald, Robert A. Iglow, and Jack I. Mann, pp. 691-732. This synopsis of recent events regarding the law of the sea was prepared by students. Its function is to provide readers with a report of recent developments relative to conservation, pollution, seabed resources, shipping, and sovereignty. The period covered is from Jan. 1, 1973 to Dec. 31, 1973. Many sources were used including the United States Code Congressional and Administrative News, the Environmental Reporter, International Legal Materials, the United Nations Chronicle, the Congressional Record, and the New York Times. [81 footnotes]

This issue of the Journal also contains the following comments:

"Toward Peaceful Settlement of Ocean Space Disputes: A Working Paper," by Wm. H. Haubert II, pp. 733-756. This article consists of a discussion on (1) The establishment of criteria for a viable means of dispute settlement, (2) Survey of the settlement mechanisms available to the international community, and (3) Evaluation of major regime proposals in light of items (1) and (2) above. [130 footnotes; appendix]

"International Law and Radioactive Pollution by Ocean Dumping: 'With all Their Genius and With All Their Skill. . . . ,'" by Jack Wm. Hodges, pp. 757-775.

9.3

mobility of tuna vessels creates difficulties for the conferees at the U.N. convention. These differences in fisheries could provide severe restrictions on the application of general rules and principles that may be acceptable to a majority of the representatives at the Conference.
[1 figure, 8 references] SW

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Four Theories are presented on how existing principles and concepts of international law can be used to prevent the radioactive pollution of marine resources resulting from ocean dumping of nuclear waste products. [104 footnotes]

"The Tuna Example: Is There Hope for International Cooperation?" by Andrew D. Rose, pp. 776-814. The author presents the history, purpose, and ensuing legislation relative to the Interamerican Tropical Tuna Commission (IATTC) and then discusses the problems of the Commission and some suggestions for solving them. The author indicates that the importance of the continuation of the IATTC goes far beyond the conservation of yellowfin tuna; it now stands as representative of all international conservation organizations in a very real test of their viability. [122 footnotes; appendix]

"Passage Through International Straits: Free or Innocent? The Interests at Stake," by Frank Nolta, pp. 815-833. The author discusses the passage through straits used for international navigation, one of the subjects scheduled for discussion by the Convention of the Law of the Sea (1974). [78 footnotes] FTP

9.2 HOW TO CALCULATE PROFIT IN A FISHING BUSINESS

Smith Frederick J.
S.G. No. 29, Oregon State University Extension Service, Marine Advisory Program, Corvallis, Oreg. (Dec. 1973), 2 pp.

9.3 PRESCRIPTIVE ADMINISTRATIVE PROPOSAL: AN INTERNATIONAL MACHINERY FOR CONTROL OF THE HIGH SEAS

Joyner, Nancy D., and Christopher C. Joyner
International Lawyer 8, No. 1, 57-73 (Jan. 1974)

The authors first review the ocean-related functions of existing United Nations functional bodies. They then present a proposed restructure of the current international framework for high seas regulations within the United Nations. The proposal includes the establishment of an Under-Secretary for Marine Environment Affairs directly responsible, as the integrator of the major agencies, to the U.N. Secretary General.
[41 footnotes] FTP

9.3 ORGANIZATIONAL ARRANGEMENTS TO FACILITATE GLOBAL MANAGEMENT OF FISHERIES

Miles, Edward (University of Washington)
Paper No. 4, Program of International Studies of Fishery Arrangements. Resources for the Future, Inc., Washington, D.C. (June 1974), xii + 23 pp. $3.00, paperbound.

This report deals with the possibilities of establishing an international fishery management agency. The trends that are occurring in fisheries, including demand for information on changes that are taking place in the fisheries and in the law of the sea, will require greatly increased support from a global fisheries management agency. This type of agency could be applied to management of fish stocks which are shared by two or more coastal states and fish stocks which are highly migratory and move to areas between the coast and the high seas outside of national jurisdiction.

The first part of this report gives a summary of the prominent political characteristics of current management in world fisheries. The second part is an examination of the effects of new trends and developments in fisheries, such as the increase in vessel mobility, the increase in fishing effort, and the probable functions of a global fishery management agency. The third part of the report gives suggestions on how a global fishery management agency might translate the extent of coastal states' rights into an international policy. The possibility of expanding FAO fishery functions to assume the responsibilities of a global fishery management agency is also discussed. The expanded functions could include greater involvement in the formulations of conservation measures, seek to coordinate, to a greater degree, the work of regional commissions, and other activities . SW

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zone concept and discusses the implications that adoption of the concept would have relative to existing international law and other convention proposals. [46 footnotes]

"Venezuela's Contribution to the Contemporary Law of the Sea," by Kaldone G. Nweihed (Institute of Marine Science and Technology, Simon Bolivar University), pp. 603-632.

Development of the continental shelf doctrine and the concept of the patrimonial sea, with emphasis on the role of Venezuela, are discussed. [60 footnotes]

"Developing Land-Locked States and the Resources of the Seabed," by Martin Ira Glassner (Southern Connecticut State College, New Haven, Conn.), pp. 633-655. The rights of the world's 26 land-locked states to the resources of the sea are discussed. [47 footnotes].

"Economic Aspects of Fisheries Utilization in the Law of the Sea Negotiations," by Lee G. Anderson (Rosenstiel School of Marine and Atmospheric Science, University of Miami), pp. 656-678. The author discusses the economic aspects of international fisheries management, the problem of assigning property rights to fishery resources in a way that maximizes economic efficiency. [14 footnotes]

"The Wealth of the Oceans and the Law of the Sea: Some Preliminary Observations," by Giulio Pontecorvo (School of Business, Columbia University, New York, N.Y.) and Roger Mesznik (City University of New York, Baruch College, New York), pp. 679-690. The authors make an original analysis of the changing values of the ocean resources and how these changes affect the problem of ocean management. The hypothesis is offered that simple extension of territorial claims will tend to worsen, not improve, the international distribution of income and wealth. [7 footnotes; appendix]

[Continued on Card B]

9.3 MARINE SCIENCE AND THE 1974 LAW OF THE SEA CONFERENCE

Knauss, John A. (University of Rhode Island, Kingston, RI 02881)
Science 184, No. 4144, 1335-1341 (June 28, 1974)

The author reviews briefly the present status of the law of the sea negotiations and then discusses in more detail those parts of the negotiations that relate to marine scientific research. Although the details of the new law of the sea regime are still to be negotiated, the author believes that the coastal nations will gain some form of jurisdiction over the fisheries and mineral resources off their shores. Probably a new "economic zone" will be established between a fairly narrow (12-mile) territorial sea and the international ocean space beyond. If this economic zone is 200 miles wide, it will encompass about 37% of the ocean. In regard to the conduct of scientific research within the economic zone, the United States has proposed that scientists not be denied access to these vast ocean areas as long as they abide by rules designed to protect coastal state interests. [2 figures, 21 references] FTP

9.3 (9.6) FREEDOM OF OCEANIC RESEARCH

Wooster, Warren S. (editor)
Published by Crane, Russak and Co., Inc., New York, N.Y. (1973), 255 pp. $14.00
Michael J. Weaver (reviewer)
San Diego Law Review 11, No. 3, 834-838 (May 1974)

A Center for Marine Affairs was created by the Scripps Institution of Oceanography in 1970 to develop meaningful dialogue between the marine scientist and those who wish to understand man's activities pertaining to the ocean. The Center's first project dealt with the growing restriction of freedom of oceanic research; apparently this study was partially necessitated by the Institute's own difficulties in pursuing scientific projects. This book contains papers dealing with the impact and limitations on research created by the world's current political problems. The discussions were mostly confined to current United States problems with respect to Latin American countries; the volume thus should be a valuable research tool for anyone interested in current Pan-American political developments. The first chapter is devoted to a review of the extent to which restrictions of access have been imposed by various nations and by international treaties. The book includes chapters that deal with the current law of the sea. FTP

9.3 THE MULTIPLE USE CONCEPT AS THE BASIS OF A NEW OUTER CONTINENTAL SHELF LEGISLATIVE POLICY

Montgomery, John E. (University of South Carolina)
Kentucky Law Journal 62, No. 2, 327-365 (1973-74)

Present Federal continental shelf policy is adequate to meet the demands likely to be placed on the region in the near future. The most glaring deficiencies in the operation of the Outer Continental Shelf Lands Act are a dominant use policy with its arbitrary priorities, an unhealthy reliance on a defense-oriented agency for regulation of civilian activities, the absence of a comprehensive legislative use policy, and inadequate protection of private investment. These problems are not now severe because the pressures of continental shelf use are still low. Interest will advance, however, because of the government's stated policy of encouragement of private investment in continental shelf activities and the region's obvious attractiveness as a reservoir of a wide variety of natural resources. A more comprehensive legislative policy will be needed. The author believes that the multiple use concept, premised on the absence of use priorities, centralized administrative control, and the adoption of an overall legislative use policy appears well suited as a basic framework. He then presents a proposed statute that reflects the concept's fundamental principles and attempts to demonstrate its application to some of the specific problems of continental shelf management.
[126 footnotes] FTP

9.6 (9.19) AN ANNOTATED BIBLIOGRAPHY OF THE EFFECTS OF LOGGING ON FISH OF THE WESTERN UNITED STATES AND CANADA

Gibbons, Dave R., and Ernest O. Salo (compilers) (Fisheries Research Institute, College of Fisheries, University of Washington, Seattle, Wash.)
U.S. Dept. of Agriculture, Forest Service General Technical Report PNW-10 (1973), 145 pp. Pacific Northwest Forest and Range Experiment Station, U.S. Dept. of Agriculture, Forest Service, Portland, Oreg.

In addition to the annotated bibliography, a review of the literature on logging and fisheries is provided. There are 278 annotations and 317 total references. The subjects include erosion and sedimentation, water quality, related influences on salmonids, multiple logging effects, alteration of stream flow, stream protection, multiple-use management, streamside vegetation, stream improvement, and reports of effects of logging. A list of research needs, as determined by questionnaires, is included. A subject and author index conclude the book. SW

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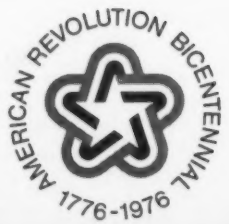
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